emagic

Logic 6

Music Production Software

for Platinum, Gold and Audio

>> Version 6.0

>> English

Getting Started

emagic

Logic|6

Music Production Software

>> Version 6.0, February 2003

>> English

Getting Started—Mac OS X

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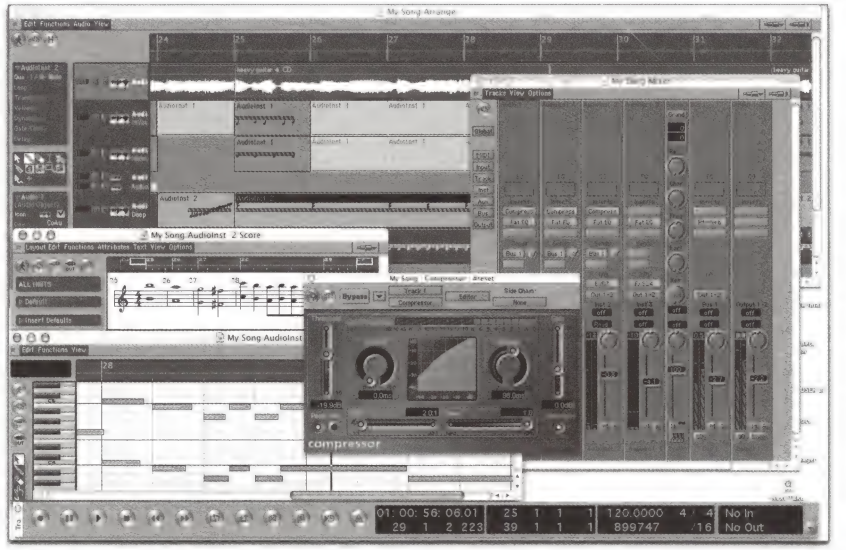
1 Welcome

... to the Logic 6 Introduction Manual.

First up, we would like to congratulate you on your purchase. In choosing your version of the Logic line, you have selected the most widely used audio and MIDI production software in professional circles.



The diagram shows—in a counter-clockwise direction from the top left—the Arrange window with several audio regions and MIDI sequences, the Score editor, the Matrix editor and the Track Mixer.

1.1 About the Introduction Manual and Reference Manual

We have created this Introduction Manual with the intention of introducing you to many of Logic's features in a practical "hands-on" way. While you can certainly read the Introduction Manual on the beach or in your favorite easy chair, we would suggest that you take advantage of the accompanying song files supplied on your Emagic Demo Songs CD-ROM. These files will assist you in quickly learning how to handle MIDI and audio information via a series of exercises and examples.

For those of you who have a keen interest in Logic's notation facilities, we have created an extensive Score Tutorial, which is also available in electronic form on the Emagic Demo Songs CD-ROM. You will also find a number of song files which will provide you with source material for the Score Tutorial.

We're sure that you're ready to "dive in" to Logic and start working through the remainder of the Introduction Manual, but before you do...

Important!

We ask that you read the following sections in this chapter, which discuss the "basics" of Logic's user interface and key information on Logic's navigational aids. This information is essential reading as Logic offers a range of unique options for interaction with its user interface. You will need to be familiar with these techniques, and the terminology used, as this information forms the basis of the Introduction Manual and will help you to develop good working habits from the outset. This will accelerate your use of Logic and will make learning the program more enjoyable and simpler.

The various editing windows, functions and options which you will be introduced to throughout the Getting Started are explained in further detail in the Reference Manual. This latter manual is designed as a reference work. In other words, you can open a specific chapter on a specific editing window, setup task etc. and find information on it. You will also discover a number of further small practical examples as you work your way through the Reference Manual which will enhance your understanding of features and functions. As a result, a number of techniques discussed in earlier chapters (of both this Getting Started and the Reference Manual) are repeated, but as the old adage goes, "practice makes perfect".

Tip

The online Help system—accessible from Logic's Help menu—is fundamentally the Reference Manual in electronic form. It has the advantage of being at your fingertips when you need it, and is also searchable.

We recommend that you read the relevant portions of the Reference Manual that interest you, in addition to this Getting Started. This Getting Started is designed to get you "up and running" with Logic quickly. It is not the final arbiter on all things Logic and does not cover all areas of the program in detail.

Important!

The *Logic Setup Assistant*—discussed in the Installation Manual (and briefly in the next chapter)—will set up your Logic system quickly and easily. As you become more familiar with Logic, you may wish to go a little further, altering preferences and options to more precisely meet your needs and tastes. As you follow the Getting Started, you learn a number of tips and tricks that will help you to customize your own working "template" song file. This template song—known as the "Autoload" song will form the basis of your future work with Logic. Rest assured, you don't "need to" get into any of these customizations, but we've included them here to give you a few ideas about how you'd like Logic to function.

Needless to say, you will be introduced to a lot of new terminology as you're reading through the Getting Started. This will be particularly noticeable throughout the early chapters. We will include explanations and diagrams throughout to help you understand the terms and functions. So, don't sweat it if you encounter a term that you're unfamiliar with—it will all fall into place as you continue reading. On this point, please read the Getting Started in the order that it is laid out. Many techniques that you will learn in one section are directly transferable to another. This way, you will have the best possible experience as you familiarize yourself with Logic.

We also ask that you pay special attention to comments that feature the "Important!" entry shown alongside the text. These are generally key points that will help you to understand a concept or fact about Logic. Where you see the "Tip" entry alongside the text, it usually indicates a shortcut, or some extra information that will help to accelerate your use of the program.

Important!

Tip

Menu Functions

For functions which can be reached via hierarchical menus, the different menu levels are described as follows: Menu > Menu entry > Function.

Key Commands

When a function can be operated by a Key Command—that's a computer keyboard shortcut—of the same name, you will see this symbol alongside the text. Many Key Commands make use of "modifier" keys—⇧ (Shift), ctrl (Control), ⌥ (Option), and ⌘ (Command) in conjunction with other keys.

If the names of a function and Key Command differ, or if a function is *only* available as a Key Command, its name will be printed as follows: *Key Command*.

Tip

We strongly recommend that you use Key Commands whenever possible. This will accelerate your use of Logic massively. As you are learning how to use the software, we ask that you use the Key Commands as you are introduced to them. This will aid you in remembering the Key Command, and in your understanding of the function.

Additional information on Key Commands can be found in the *Key Commands* section, from page 42 onwards.

Options and Parameters

Options set in Logic's Preferences, and the parameters in dialog boxes are printed as follows: *Parameters*.

Different parameter values are shown as follows: *Parameter value*.

Detailed Explanations

Periodically, detailed explanations will be written for things which you don't necessarily need to know, in order to understand how to use Logic. These are printed in this font style.

1.2 For Those Who Hate Manuals

If you're a reasonably proficient computer user who is familiar with audio and MIDI sequencing, you may wish to skip directly ahead to the *Using Logic* chapter, from page 75, to "get your hands dirty".

Chapters 1 and 2 cover the basics, and background information that you will need to know, in order to set up, and more fully use, your Logic system.

You can always refer back to these chapters as you're working through the "Using Logic" chapter, if necessary.

We do ask, however, that you *do* find the time to read these chapters at some stage, as this will help you to understand the basic structure and mechanics of the program. It will also make learning and using Logic more fun, and more productive.

1.3 A Starting Point

In writing this Getting Started, we needed to decide on a starting point. To this end, we ask that before you begin:

- Your computer meets the minimum requirements necessary to run your version of Logic.
- You have followed the separate Installation Guide and have correctly installed your version of Logic on the computer's hard disk.
- Your audio and MIDI interface hardware is correctly installed and has been identified and set up correctly in Logic.
- You have successfully run the *Logic Setup Assistant*. If not, don't sweat it. We'll take a look at this at the beginning of the next chapter.

For any hardware setup or software installation issues, please refer to your hardware manufacturer's installation guides and the Troubleshooting section of the Logic Installation guide.

1.4 What Is Logic?

The Logic software is an integrated 32 Bit audio and MIDI recording system with flexible notation, fully automated mixing and native audio DSP effects processing facilities. You can:

- Record MIDI information via connected MIDI input devices, such as keyboards, and play back this information via any connected MIDI device, including keyboards, samplers, synthesizers or drum modules.
- Create, arrange and edit MIDI songs, and print out musical notation via a printer connected to your computer.
- Digitally record acoustic and electric instruments or vocal performances into your songs, and process these audio recordings through Logic's in-built real-time effects.
- Add fully functional software synthesizers, instruments and samplers such as Emagic's ES1, ES2, EVP88, EVB3, EVD6 and EXS24, or third-party AudioUnits instruments to your copy of Logic. It should be noted that Logic ships with three software synthesizers, to get you started.
- Mix your MIDI and audio tracks, including effects and software-based instrument settings, via a sophisticated total recall mix automation system.
- Bounce all audio data, including effects and mix automation settings, to a stereo (or multiple Surround format) file(s) for mastering or further processing.

Logic incorporates the functionality normally found in an entire professional audio production studio. All within an intuitive user interface, and all within your computer.

1.5 Audio and MIDI

Now that you know Logic can record and play back both MIDI and audio information, we have included the following which offers a brief and easy to understand description of both. If you already have an understanding of how MIDI and digital audio recording systems work, you can skip ahead to the *Audio Tracks* section, from page 22 onwards.

1.5.1 MIDI

MIDI is an acronym for Musical Instrument Digital Interface. To break this down further—the "Musical Instrument" part of MIDI refers to electronic musical instruments such as synthesizers, samplers and even MIDI guitars. The "Digital Interface" part sounds technical, but really isn't.

Basically, MIDI's "Digital Interface" is broken down into two components.

1 MIDI is a computer-based language—and as you probably know, computers talk "digitally". MIDI keyboards, modules and cards are actually computers in disguise.

2 MIDI's "Interface" is just that. MIDI is a hardware standard which consists of a set of physical connectors labeled IN, OUT, and THRU. You will find one or more of these connectors on all MIDI devices, such as keyboards etc.

The MIDI Language

The "language" of MIDI is understood by all MIDI devices. The purpose of the language is to translate your musical performance into information that can be understood by a computer. (Don't forget that MIDI keyboards and modules are actually computers in disguise).

When you play your keyboard, or Logic is playing a MIDI song file, MIDI information which *describes* your performance is transmitted as a string of "MIDI messages". These instructions tell any connected synthesizer, soundcard etc. *how* to play a piece of music. The synthesizer, module etc. receiving the MIDI data actually generates the sounds which you hear.

MIDI does not send sounds. It only sends instructions. **Important!**

The MIDI Connection

MIDI, as mentioned, is also a hardware "interface" which consists of a standardized set of connectors labeled IN, OUT, and THRU.

MIDI connectors consist of a round socket with 5 holes arranged in a semicircle. MIDI cables, used for connecting MIDI devices have a matching plug with 5 pins. Only three of the pins actually carry information.

MIDI only works in one direction on each connector. If you want your MIDI keyboard to send messages *to*, and receive messages *from* Logic, you must connect *two* cables.

Here's the way your MIDI connections must be made, in order to work:

- MIDI OUT connectors must be connected to MIDI IN connectors on the receiving device.
- MIDI IN connectors must be connected to MIDI OUTs

If you connect a MIDI OUT to another MIDI OUT or a MIDI IN to another MIDI IN, no communication will happen, and your MIDI system won't work.

The MIDI THRU connector is not found on all MIDI devices. It simply mirrors the MIDI messages arriving at the MIDI input connector, and allows you to "daisy-chain" more MIDI devices. Before doing this, read the section on MIDI channels, which is very important when chaining MIDI keyboards, modules etc.

The "MIDI messages" are sent from a MIDI controller such as a keyboard or sequencer—i.e. Logic—via the MIDI OUT connector. The device (MIDI synth or sound module) receiving the MIDI messages at its MIDI IN connector, responds to these messages by playing sounds.

Remember, MIDI does not send sounds. It sends instructions on how, what and when to play.

Tip

Many MIDI keyboards include both the keyboard controller and MIDI sound module functions within the same unit. In these units, there's an internal MIDI link between the keyboard and sound module. This internal link can be enabled or disabled by setting LOCAL ON or OFF—on the keyboard itself.

When using your MIDI keyboard with Logic, and the keyboard is acting as both controller and sound module, you should set LOCAL to OFF. Doing so avoids "it sounds like my notes are doubled or flanging" types of problems.

If your keyboard is simply acting as an input device, and you don't want to use its sounds (or it doesn't have any, as is the case with controller keyboards), you simply need to connect its MIDI OUT to the MIDI IN on your computer. Logic will take care of the "channels", which we're just about to take a look at.

MIDI Channels

MIDI is divided into 16 logical "channels". Each channel is identified by a special channel number message that is sent with the other MIDI messages. Most keyboards can generally be set to transmit on any one of the 16 MIDI channels. A MIDI sound source—like your synthesizer, sound module or soundcard—can be set to receive on a specific, or multiple, MIDI Channel(s).

Devices capable of receiving on multiple MIDI channels simultaneously are said to be "multi-timbral". The term literally means "many sounds", which can be a little confusing, as most synthesizers are obviously capable of producing many sounds. Not all synthesizers, however, are capable of producing many sounds at the one time. This capability means that a suitably equipped MIDI keyboard, module or soundcard could be used to produce all of the drum, bass, piano, string and brass sounds in a performance.

In this scenario, each part or instrument—drums, piano, strings etc.—will be assigned to a specific MIDI channel. Given the 16 logical MIDI channels available to each MIDI port and a multi-timbral synthesizer, up to 16 different "instruments" can be played simultaneously. Most modern MIDI keyboards, modules and sound cards are multi-timbral.

Tip

In *all* MIDI systems, the sound module must be set to receive on the channel (or channels in multi-timbral devices) which match the channel(s) that the keyboard controller (or Logic) is transmitting on, in order to play sounds. If the channels do not match, the receiving device will not play.

As an example: Imagine a 4-way multi-timbral device (a device capable of receiving on 4 MIDI channels simultaneously) is receiving song data from Logic with tracks assigned to channels 1, 2, 4 and 5.

The device itself is set to receive on channels 4 to 8. In this case, only the song's MIDI data sent on channels 4 and 5 would be "seen" by the device and subsequently played. The MIDI data sent on channels 1 and 2 would be ignored.

As you can see from the above example, each channel needs to be "tuned in" to a corresponding channel sent from Logic. This, if you use a little imagination, is not unlike tuning in a TV or radio channel. If the channel isn't tuned properly, you won't see or hear anything ... and neither will your sound module!

1.5.2 Audio

Audio, as a term, basically refers to any sound that you can hear. In the physical, as opposed to computer world, this is known as *Analog Audio*. When Logic records analog audio signals via an audio interface connected to, or installed in, your computer, the audio is converted into digital information. This information is stored as a *Digital Audio* file on your computer's hard disk.

As with MIDI, the "Digital Audio" part sounds technical, but really isn't. As discussed earlier, computers talk "digitally" and need to deal with analog audio signals as digital information.

Unlike MIDI, digital audio files are actually recordings of sounds, *not* an instruction language.

Important!

Digital and Analog Recording

While digital audio recording is similar in concept to analog recordings made on tape, the technical differences are significant. For much of the 20th century and into the 21st, analog tape recordings have been used for the storage of audio performances—spoken, sung and played.

The analog tape medium (i.e. the tape itself) is a thin plastic strip coated in tiny metal particles. It is usually stored on a roll or spool or as a cassette tape, which you're probably familiar with.

The process of analog tape recording involves the transmission of small electrical charges, sent to the magnetic "heads" of a tape recorder. Changes to the strength of these charges alter the magnetic fields generated by the heads, and rearrange the positions of the metal particles on the tape. Needless to say, this is a less than precise science. Due to the randomness involved in the rearrangement of magnetic particles on tape (and other technical reasons), the recordings are said to be "analogous"—i.e. similar to the actual performance.

Digital recording, on the other hand, is much less random. Analog performances are converted into digital audio files via the ADC (Analog to Digital Converter) of the audio interface. These files, like all computer files, are stored "digitally"—i.e. as a series of ones and zeroes. Provided the source material and levels remain consistent, digital recordings will be virtually identical each time they are made.

In a copying situation—i.e. tape to tape—there is no comparison between analog and digital recordings. Each subsequent copy of an analog recording becomes noisier and less like the source material. This is the "random" factor of the magnetic particles becoming less like the original each time a copy is made.

Digital audio files, on the other hand, can be copied any number of times, with each subsequent copy adding no noise.

On a more practical level, digital audio files stored on hard disk have the following advantages over analog audio stored on tape.

- Digital audio can be cut, copied and pasted freely from location to location. Could you imagine physically cutting a stereo analog recording—i. e. a tape—into even four or five segments and splicing them back together? Ugh! Not pretty!
- You can move to any spot in a digital audio file almost instantly rather than waiting for the tedious mechanical rewinding and fast forwarding of an analog tape machine.
- You can process digital audio in ways that are simply impossible with analog audio. As one example, it is possible to adjust the pitch of a digital audio file without changing its speed.

Digital Conversions

When an analog audio signal arrives at the inputs of your computer's audio interface, it must be converted into digital information before the computer can deal with it. This process is called "analog to digital conversion" and is handled by the Analog to Digital Converter (ADC) of your audio interface/soundcard.

At the other end of the signal path, the digital signal needs to be reconverted into an analog signal so that it can be listened to through analog audio playback systems—i. e. an amplifier and speakers. This process is called "digital to analog conversion" and is dealt with by the Digital to Analog Converter (DAC) of your audio interface/soundcard.

1.5.3 About Bits and Sampling Rates

When recording a sound into your computer, the ADC of your audio interface takes a "sample" of the sound source, a specific number of times per second. This is known as the "sample rate", which is measured in kHz (kilohertz—kilo means thousand) or "x" thousand samples per second. The higher the rate, the more samples the AD converter takes, and the more accurate the digital representation of the sound will be.

Put another way, imagine each sample to be a photograph of a concert that you were trying to describe to a friend. If you had taken one photo every 10 minutes, you'd find it hard to describe the great light show. If you took a thousand photos during that 10 minutes, your friend could easily see what happened. This increased "rate", or number of photos (i. e. samples), gives a far more accurate

overall picture of what happened. This is how sampling works. The more "sonic photos" taken, the more accurately the sound is represented over time. A video-tape recording of the concert—running at 25 frames (samples) a second, gives an even more accurate idea of the light show.

Common sampling rates used in audio production include: 44.1kHz or 48kHz, and high-end systems may use rates from 96kHz up to 192kHz.

The sampling resolution—that's the "bit" thing—is the accuracy or precision of the measuring scale used to store the numbers of each sample. Remember that computers store audio files as digital information—a series of ones and zeroes. There are three audio file resolutions commonly in use: 8, 16 and 24 bits. 24 bit systems are more expensive and are used extensively in DVD audio and film production.

Many "24 Bit" audio hardware devices are actually 17 or 18 bit devices, so don't always believe the marketing materials and specs you see.

To give you an idea of the relevance of the sampling resolution, imagine two people are building a house. One is using a tape measure marked to the nearest foot. The other has a tape measure marked to the nearest inch. Although the house built with the tape measure accurate to the nearest foot may not fall down, the one using the finer scale will build a more accurate house.

1.5.4 About File Formats

Continuing on from the 24 bit and 16 bit resolution discussed above, Logic can record and play back 16 and 24 bit audio files. You can even use both 16 and 24 bit files in the same song. The advantage of the higher resolution 24 bit files in Logic is most apparent when mixing.

Every mixing operation in Logic—a volume change, panning, effects processing etc. involves some sort of mathematical calculation. In digital systems, where everything is represented by ones and zeroes, there are (often) occasions where the calculations don't result in a nice, round number. To handle this, Logic will "round off" the value resulting from the calculation to the nearest suitable value. This is known as a "roundoff correction" in digital audio speak.

If you begin with a 24 bit file, the sample is represented by around 16 million little "slices", whereas the 16 bit file of the same audio is represented by 64 thousand "slices"—note that "slices" is not a technical term, in any way!

As you can see, the higher resolution 24 bit file has far more "slices" that could be used as possible values during a "roundoff correction". The end result of all of this?

24 bit files retain more of the original "character" of the sound after processing/mixing, making your mixes more "precise", largely avoiding "coloration" of the sound.

1.5.5 About MIDI and Audio File Sizes

Digital audio files consume a great deal of hard disk space. "CD quality" audio with 16-bit dynamic resolution and 44.1kHz frequency resolution requires 5 megabytes (MB) of hard disk space for 1 minute of *monophonic* audio. For a *stereo* recording, this requirement is doubled, with a one minute audio file using 10 MB of storage space.

MIDI file data, on the other hand, is tiny. An average MIDI song file, three minutes in length and containing a dozen or more tracks will be about 20 kb in size.

The reason for this huge difference in size is that MIDI is, as discussed earlier, a language that *describes* what notes to play. The actual sounds themselves are generated by a connected MIDI device.

1.6 Audio Tracks

Dependent on your version of Logic, and the audio hardware installed on your system, you can play back up to 255 audio *tracks*. Each audio track has an associated audio channel strip in the Audio Mixer/Environment window. We'll discuss the use of the mixer channels as we work through the Introduction Manual, but for now we'd just like to cover the relationship between "tracks" and "channels".

Audio *tracks* and mixer *channels* are related. **Important!**

You can not record or play back audio tracks unless a corresponding audio channel—also known as an audio "object"—is first created in the Environment window.

The *Logic Setup Assistant* will help you to automatically create a number of audio *track* objects, *busses* and *audio instrument* channels the first time you run Logic.

You can add and remove audio channels freely at any time, up to the capacity of your audio hardware and version of Logic. Adding extra channels means that you can then play back more audio tracks—provided that your computer and audio hardware are up to the task.

Note that you may need to make changes on your Audio Hardware & Drivers page in order to add additional tracks. Please see the relevant section in the Reference manual.

We'll briefly discuss the use of the *Logic Setup Assistant* in the next chapter—The Ideal Workspace.

1.7 MIDI Tracks

Where audio tracks are said to have a corresponding "channel", MIDI tracks have a corresponding "instrument" in the Environment.

This differentiation in terminology is very important to make a mental note of now. As we work through the Getting Started, you will discover many references to "instrument" and "channel". We will clearly specify audio or MIDI channels throughout.

Important!

We'll discuss the creation of MIDI instruments and other MIDI objects via the *Logic Setup Assistant* in the next chapter—The Ideal Workspace.

1.8 Logic Terminology

You've obviously encountered a few new terms at this stage, such as: *channels, objects,* the *Environment* and many more. This brief overview will provide you with some simple explanations, before we move on to the mechanics of using Logic's interface.

- *Object*—Logic is an "object-oriented" program, which means that it is "oriented" towards your interaction with graphical "objects", in order to make use of them. A "sequence" or "audio region" could be considered an object, as could a graphical fader in the Environment and Mixer windows, or another graphical element of Logic's interface.
- *Audio Region*—An "audio region" is an "object" which appears in the Arrange window. It is simply a pointer to an "audio file", or a part of an audio file.
- *Audio File*—This is a computer file which is a digital recording of a sound. Please refer back to the *Audio* section, from page 19 onwards, if you need a refresher.
- *Sequence*—An "object" which contains MIDI data. This MIDI data can include note, program change, controller or other types of MIDI "events". Please refer back to the *MIDI* section, from page 16 onwards, if you need a refresher.
- *Event*—refers to a single MIDI message. Technically, a "single" MIDI message such as a note event contains four messages, but in Logic you will deal with a single "event" onscreen. MIDI events can be viewed and changed in a number of ways through the use of several different editing windows available in Logic.

The individual editing windows will be discussed in far more detail as you work through the Getting Started, but here's a quick rundown on the windows you'll use on a day-to-day basis:

- Arrange—Logic's primary working window. Here, you can record, arrange, mix and automate MIDI and audio "objects". MIDI objects are known as "sequences" and audio objects are known as "audio regions" in the Arrange window.
- Event List—This editor provides a detailed view of "events" and "objects", allowing you to directly interact with, and manipulate them, in an alphanumerical (letters and numbers) list.
- Matrix—Note "events" are displayed as horizontal bars onscreen. You can directly interact with these events graphically.
- Score—Again, note "events" are displayed and edited graphically, but in the form of standard musical notation.
- HyperEdit—This is a grid-based graphical editor which allows you to "draw" in various types of MIDI events.
- The Audio Window—This window provides an overview of all audio files used in the song. You can perform several important operations in this window.
- Track Mixer—Provides control over volume and pan plus other parameters for your MIDI and audio hardware devices. Here, you interact with "objects" which look, and behave, like the faders on a mixing console.
- Environment—This is a graphical window which essentially allows you to set up the input and output routing of your MIDI and audio hardware by using icons which represent your audio and MIDI devices. The initial set up of your audio and MIDI devices as "objects" in the Environment is taken care of by the *Logic Setup Assistant*. You can return to the Environment window at any time to add, remove and customize objects to meet your needs/tastes. We'll look at a few of these customizations in the next chapter.
- The Project Manager—Allows you to select, move and generally manage all file types that Logic can use.

1.9 The Mouse

1.9.1 Basic Functions

Many functions performed with the mouse make use of "modifier" keys—⇧, ctrl, ⌥, and ⌘ in conjunction with the methods outlined below.

Clicking

Place the mouse pointer on the desired "object"—button, input field, MIDI note event, sequence, audio region or file etc.- and press (and release) the mouse button quickly.

Double-clicking

The same as clicking on an object, but you press the mouse button twice, in quick succession. You can set the appropriate time-span between clicks in your operating system's Control Panel.

Grabbing or Click-holding

The same as clicking on an object, but you keep the mouse button held down.

Moving or Dragging (Drag 'n Drop)

Grab the object and move the mouse (with the mouse button depressed) to the desired position. You will generally release the mouse button to "drop" the object once the desired destination has been reached.

Scrolling

Throughout Logic, many menus and windows allow you to scroll horizontally or vertically. In most locations this is done with the mouse button depressed.

1.9.2 Mouse Input

Checkboxes

Checkboxes are square boxes which become "checked" (with a tick or cross) when you click in them to activate an option, preference or function. Clicking in them a second time will remove the "check" and deactivate the option.

Pull-down (Flip) Menus

Pull-down menus (also known as Flip menus) open when you click and hold on certain input fields or buttons. You can make a selection within the menu by scrolling to, and highlighting, the desired item and releasing the button. If you wish to choose an item which is outside the visible section of the flip menu:

- Move the mouse over the top or bottom edge of the menu; the further you move it, the faster you will scroll through the menu.

ℹ Many of Logic's menus are "sticky". This means that once the menu is opened, the mouse button can be released and the menu will remain open until an option is selected or until you click outside the menu with the mouse.

Mouse as Slider

Almost all numerical parameters, including note values and lengths, can be adjusted by click-holding on the parameter value and moving the mouse up or down. If the parameter is comprised of several separate numbers (e.g. song position), you can adjust each individually.

Numerical Input

Double-clicking on a numerical parameter value opens a numerical input field. The previous value will be highlighted, allowing it to be overwritten with a new entry. You can also use the mouse to make a partial selection in an input field so that only the highlighted value is overwritten (e.g. song position).

Important !

As long as an input field is open, the computer's keyboard is limited to data input, and may not be used for Key Commands.

... by arithmetic

At any time, you can enter numbers by typing in an arithmetical operation, e.g. "+2" or "–5", which then simply changes the current value by that amount. Hit the ↵ key to activate your choice and exit the parameter field. Alternately, you can click once on the window, anywhere outside the parameter area.

... as ASCII-symbols

You can also input numbers as ASCII symbols: Simply type a ' or " in front of the symbol, and the ASCII code will be input as a number. For example:

"! results in a value of 33

"a results in a value of 97

This function is particularly useful for entering text in SysEx strings.

Text Input

Text names are altered in the same fashion as described for numerical input, but the name field need only be clicked once to allow input.

Numbered Names

You can give any number of selected objects the same name. If the name ends in a number, the number will automatically be incremented by 1 for each subsequent object. This allows you to name all sequences on a single track quickly, while retaining a differentiation between them. The selection of multiple objects is discussed in the *Selection Techniques* section, from page 37 onwards.

Disabling automatic numbering

To disable automatic numbering, place a space after the number at the end of the name. All selected objects will then end in the same number.

1.9.3 Tools and the Toolbox

Logic allows recorded data to be handled graphically. This means that you don't need to perform editing operations via arcane command line or table entries. Rather, you can deal with your data by manipulating graphical "objects" which represent your notes, volume levels, pan positions etc. You do this by using "tools".

When editing objects graphically, you always have two tools available for immediate use, without needing to visit the Toolbox. One is already active, and the other is activated by holding down the ⌘ key.

You can change the currently active tool by clicking on the appropriate tool in the Toolbox. The mouse pointer will adopt the shape of the selected tool, enabling you to know what function is assigned to the mouse by simply looking at the mouse cursor. The Eraser is used for deleting, the Scissors for cutting and the Glue tool for merging objects.

Effective Range of the Tools

- Tools are only effective in the working area of the editing window in which they were selected. Individual tools can be defined for each open window.
- A tool basically affects the object you click on. If multiple objects are selected, the tool will operate on them all.

Opening the Toolbox at the Mouse Position

Tip

Use *Show Tools* (default: esc) to open a toolbox at the mouse position. This window will disappear as soon as:

- you choose a tool by clicking the mouse
- you choose a tool by pressing a numerical key
- you click anywhere outside the tool window or
- press any key.

Selecting Tools

To select a tool, click on it in the toolbox.

If a toolbox is opened at the mouse position (Key Command: *Show Tools*, Default: esc) you can also use a numerical key to choose a tool. Tools are numbered from the top left to the bottom right. Press the Show Tools key again to deselect a tool, switch to the pointer, and close the box.

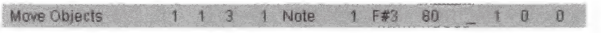
Info Line

The Info Line replaces the local menus in the active window.

The Info Line provides useful feedback about the type of operation you are performing. During operations involving Arrange window objects, the Info Line will look similar to the following:

From left to right, the Info Line displays: name of the operation, mouse (or Arrange window object) position, Arrange window object name, track number, and length of the Arrange window object.

During operations involving events, the Info Line looks something like this:



From left to right, the Info Line displays: operation, mouse (or event) position, event type, event MIDI channel, first data byte (i.e. the pitch for notes), second data byte (i.e. velocity for notes), and for notes: length of the note.

About the Tools

There are additional tools to those outlined below, which are found in specific editing windows. The following are the primary tools used in song construction and editing. The window-specific tools are discussed in the Getting Started and Reference manual, in conjunction with topics and examples covering their use.

Pointer

The Pointer is the default tool. The mouse cursor also takes on this shape outside the working area, when you are selecting from a menu or entering a value. Within the working (active) area, the Pointer is used for:

- selecting (by clicking on objects)
- moving (by click-holding and dragging)
- copying (by holding down the ⌥ key and dragging) and
- editing lengths (by click-holding the bottom right or left corner and dragging).
- click-holding and dragging anywhere on the window's background allows you to "rubber-band select" multiple objects.

Pencil

The Pencil is used to add new objects. You can also select, drag, and alter the length of objects with this tool.

Eraser

The Eraser deletes objects. This is done by clicking on them once. When you click on a selected object, all other currently selected objects are also deleted (as if you had used the backspace key ⌫).

Text Tool

The Text tool is used to name Arrange and Environment window objects or to add text to a musical score.

Scissors

The Scissors are used to split Arrange window objects, e. g. before copying or moving individual sections.

Glue Tool

The Glue tool is the opposite of the scissors: all selected objects are merged into a single object, which is given the name and track position of the first of the objects on the time axis.

Solo Tool

Click-holding with the Solo tool allows you to isolate and listen to selected objects. This function works during playback or when the sequencer is stopped. Soloed objects will be outlined in yellow.

Mute Tool

Clicking on an object with the Mute tool stops it from playing and places a bullet in front of its name, to indicate that it is muted. The color of the object is also muted, so a bright purple will turn a shade of lilac, for example. You can unmute the object by clicking on it again with the tool. If multiple objects are selected, the mute tool will affect them all.

Tip

You may also wish to activate the *Muted Objects are textured* parameter in the Logic Menu > Preferences > Display Preferences, to further highlight muted objects. This is particularly useful on gray (non-colored) objects.

Zoom Tool

The Zoom tool allows you to zoom in on a section by "rubber-banding" it, right up to the maximum possible window size. To revert to a non-zoomed view, click on the background of the active window with the Zoom tool.

Crossfade Tool

In the Arrange window, the crossfade tool allows you to simply click-hold and drag across the section where two audio regions meet. A crossfade will automatically be created between the regions.

Velocity Tool

In the Matrix and Score editors, you can use the "V" tool to change the velocity of notes. To do so, click-hold on the desired notes and scroll vertically. Moving up increases velocity, and down decreases velocity.

Marquee Tool

In the Arrange window, you can use the Marquee tool (looks like a crosshair, or plus sign) to select a portion of an individual sequence or audio region, or a horizontal selection of multiple objects. To use the Marquee tool, select it from the toolbox and drag from from left to right across the desired objects. As you do so, you will see a Marquee box (shaded area) appear onscreen, indicating the range of the Marquee selection. All data that falls within the Marquee area will be affected by parameter changes or functions.

Obviously, some parameters are only relevant to either audio regions or MIDI sequences. If such parameter changes are applied when both audio regions and MIDI sequences are selected, there will no change with one type of data, while the desired change is made to the selection. e.g. if a portion of an audio region and MIDI sequence are selected, and the *Transpose* parameter is used, only the MIDI sequence will be affected.

Automation Tool

This tool has various functions which are dependent on the setting shown in the flip menu just below the tool. The two flip menu options are *Curve* and *Select*.

Curve

You can bend the line between two nodes or any selection. There are 4 different curve types available: convex, concave, and two different types of S-curves.

Select

You can rubber band select any lines and/or nodes in the Automation track (see *"Rubber-Banding"* section on page 38). If *the object* is clicked once, all currently visible automation events that fall within the object borders will be selected. Once a selection has been made, you can freely adjust the Automation data levels, copy, move them etc.

Note: the rubber band function is also available when using the standard Arrow Tool, by holding down ⇧.

Hint: if you want to change the volume (or other controller) of an object, relative to all existing automation, you can do the following:

- Choose the "Select" mode from the Automation Tool flip menu
- Select the desired parameter—Volume, for example
- Click on the object. This will select the data within the object borders.
- Move the selection up or down. This is relative if you click outside the line, and absolute if you click on the line directly.

Tip: You can instantly access a second tool by holding the ⌘ key and selecting the desired tool. Once done, this allows you to toggle between the pointer and scissors tools, for example. This functionality works independently for each window.

1.10 Window Functions

The basic functions of Logic's edit windows are the same as those found in other Macintosh applications. The display options available in Logic's windows, however, are far more extensive.

In Logic, you can open different combinations of edit windows (even several of the same type) and adjust each one individually. All open, and "linked" windows in a song are constantly updated. When linked, any alterations made in one window will immediately update the display of all other open windows. The various windows can also be set to follow the song position. We will discuss the relationship between edit windows at the beginning of the next chapter.

1.10.1 Working with Windows

Opening and closing Windows

All Logic edit windows can be opened via the Windows main menu. You may open as many copies of the same type of window as desired. The relevant Key Command, which allows you to open the window without using the mouse, is displayed behind each menu item. Read the *Key Commands* section, from page 42 onwards for further information on these keyboard shortcuts.

Tip

Each time you use the Windows menu, take a quick look at the Key Command for each edit window—that way you will soon memorize them. As a preferable option to visiting the Windows menu, simply use the Key Commands as indicated. If you develop the "habit" of using keyboard shortcuts rather than the mouse, you will find Logic much faster and more elegant to use.

You can close windows by clicking on the close symbol to the top left of the windows.

If you hold down the ⌥ key as you click, all open windows in the active song will be closed.

Setting Window Size

You can adjust window sizes by dragging the lower right-hand corner of the window, as with any window in the Finder.

Maximizing window size

The windows maximize button, found in the upper corner of the window, toggles the window between its maximum size, and the size it was prior to clicking the button (Windows > Zoom Window).

Selecting the Working Area

Scroll Bars

The scroll bars are situated along the right and bottom edges of a window. They are visible when the working area exceeds the dimensions of the window on either the vertical or horizontal axis.

You can scroll through the working area by clicking the arrows found at either end of the scroll bars or by click-holding and dragging the scroll slider. Note that:

- the size of the scroll slider changes in relation to the overall length of the scroll bar
- the scroll bar's length corresponds to the overall size of the working area
- if the working area and visible area are of a similar size, the scroll slider will be longer
- the visible section changes as you move the scroll slider.

X/Y Element

The X/Y element is situated at the bottom left corner of the window (left of the horizontal scrollbar). By click-holding and dragging it, you can move both horizontally and vertically on the currently displayed window section, as if you were dragging both scroll bars simultaneously.

Page Scrolling

Use the *Page Up*, *Down*, *Left* and *Right* Key Commands to scroll one page up, down, left or right.

The *Page Top*, *Bottom*, *Left most* and *Right most* Key Commands move the visible section of the working area to the top, bottom, left or right, as if you had grabbed one of the scroll bar sliders, and moved it to one of its extreme positions.

Zooming

The telescope-shaped zoom symbols in a window are used to zoom in and out on the working area display. Clicking the smaller side of the telescope symbol reduces the size of the objects in the display, allowing you to see more objects in the same space (zoom out). Clicking on the telescope's larger side increases the size of objects in the display (zoom in). In some windows, only one telescope is available, and is used for simultaneous horizontal and vertical zooming.

ℹ While "zooming", the top left *selected* object will be kept in the visible region, whenever possible.

Zooming Selectively

Zooming In on a Section of the Screen

To enlarge a section of the screen until it fills the whole window, use the Zoom tool to "rubber-band" the desired section. You can do this repeatedly until the required viewing size is attained.

ℹ You can also hold down the ⌘ key, and drag across the desired area. To revert to the previous zoom setting, hold the ⌘ key, and click with the mouse button.

Tip

Reverting to the Previous Zoom Setting

Click on the window's background with the Zoom tool. This will return the zoom to the previous setting. If you have used the Zoom tool multiple times, then each click on the background will take the zoom level back one step, until the original zoom setting for the window is reached.

Window Elements

Adjusting the Size of the Window Elements

If you move the mouse over the top left corner of the Arrange area, the mouse pointer turns into a crosshair. By dragging it, you can now adjust the size relationship of the Bar Ruler, Arrange area, Track List and Transport (if shown). You can also adjust the window elements in the Score and Matrix Editors using the same method.

Concealing/Revealing the Transport Functions

Use View > Transport to display or remove the transport panel from the top left corner of the Matrix or Arrange windows. The number of buttons and indicators shown is dependent on the amount of space available to the transport.

Concealing/Revealing the Parameters

The View > Parameters (*Hide/Show Parameters—Key Command H*) function allows you to display or hide the entire area to the left of the Arrange and other editor windows. This area normally contains the toolbox, sequence or object parameters. Hiding these parameters allows more space for the edit window itself.

Menus

Most functions are not found in the main menu bar, but appear as local menus. These local menus will update to offer functions that are relevant to the currently active editing window.

Menu Options with "..." in their Title

Three periods following a menu function, as shown: ..., indicates that the entry will open a dialog box, rather than directly perform a function.

Dialog Boxes

In Dialog boxes, you can hit the highlighted button by pressing the ⏎ key, or the "first letter key" of the desired button/option. Note that this only works with English keyboards, even if another language localization is in use.

Window Types

You can open as many windows as desired, including several of the same type. Even though the contents of all windows are constantly updated, only one window has the status of being the "top", or "active" window. This is the window which is in the foreground, when several windows overlap.

The active window can be recognized by its "fully-shaded" (in accordance with your O. S. preferences) title bar. The main distinguishing characteristic of this window is that Key Commands only affect this window, and not any of the others.

Tip: You can switch the topped window with a Key Command (default: ⇧W).

"Floating" Windows

"Floating" windows are always visible, regardless of the selection status of a "topped" or "active" window. An example of this may be a plug-in window for a software instrument, which you would like to see (and tweak) while in the Arrange window.

Any edit window can be opened as a float by holding ⌥ while selecting the desired window from the Windows menu.

1.10.2 Links between Windows

The two buttons to the top left of a window (shown here), determine the window's relationship to the song position (Catch), or to other windows (Link).

Catch

The Catch function means that the visible section of a window follows the song position as the song plays.

If the button with the walking man on it is illuminated (i.e. if it is blue), the window's display will update to follow the song position as the song plays. If the button is not lit, the display does not update, even when the song position line scrolls beyond the right-hand side of the visible portion of the window.

To toggle this on/off, simply click on the button, or you can set up a Key Command for the *Catch Clock Position* function.

Tip

Automatic Catch Disabling

If you move the visible section manually, Catch is automatically switched off, which ensures that the selected song section doesn't disappear, as the display updates to follow the song position line.

Autocatch

The *Enable Catch when Sequencer starts* (Logic Menu > Preferences > Global Preferences...) function always enables Catch mode whenever you press play or pause.

The *Enable Catch when moving SPL* option means that whenever you move the Song Position Line, the Catch function is switched on.

Allow Content Catch by Position if Catch and Link enabled—If the catch and content catch functions are active, the contents of the sequence at the current song position are what is shown. If there is no check in the box, the window view still follows the song position within the displayed sequence, but does not update to show the contents of subsequent sequences when they become the current sequence.

Link Modes

Clicking on the Link button activates Link mode. This means that the window will show the contents of the selected object. Selecting a sequence in the Arrange window will update the display of the linked editor to show the contents of the selected sequence.

Content Linked (double-click on the Link symbol: yellow): activated by a double click on the Link symbol. In this mode only the object currently selected in another window (which most of the time is a single sequence, but can also be a folder) is displayed in the edit window.

Linked (single click on the Link-symbol: pink): The edit window displays the same display (folder) level as the Arrange window. This is most relevant if you work with Folders.

Not Linked (Link button deactivated: gray): in this mode, Logic simply stays at the currently visible Display Level and doesn't react to sequence selection in other windows. For example, if you always want to see the full score in a particular Score window, choose this mode once the full score is displayed in that window.

1.11 Selection Techniques

Whenever you wish to perform a function on one or more objects, you must first "select" the objects. This applies to Arrange window objects—MIDI sequences and audio regions—and individual events (notes, controllers etc.). Selected objects are either highlighted, or will blink on and off (in the Score editor).

The selection status of an object applies to all windows. A specific object selected in one window will also be selected in all other open windows that display the same object. Changing the top window doesn't affect the selection. Ensure that you don't click on the edit window's background, as this will deselect everything. Click on the desired window's title bar should you wish to switch between open windows without canceling the selection.

1.11.1 Selecting Individual Objects

An individual object may be selected by clicking once on it, and deselected by clicking on the window's background, or by selecting another object.

Don't forget that you can also select a portion of an object with the Marquee tool. See the *Marquee Tool* section on page 30.

1.11.2 Selecting Several Objects

To select several non-contiguous objects, hold down ⇧ as you click them. As you click on subsequent objects, the previous selections are retained. This also works with horizontal or rubber-band selection.

Horizontal Selection

To select all objects aligned horizontally on a track, click quickly on the track name in the Track List. Similarly, you can select all notes of a certain pitch in the Matrix editor by clicking the relevant key on the onscreen keyboard.

If in Cycle mode, track selection will only select events falling within the Cycle zone.

"Rubber-Banding"

To select adjacent objects, click on the window's background and drag a "rubber band" over them. You will see an outline appear onscreen. All objects touched or enclosed by the rubber-band outline will be selected, and will be highlighted to indicate their selection status.

Toggling the Selection Status

When you make any selection (including by rubber-band or horizontal selection), while holding down the ⇧ key the selection status of the objects is reversed.

You can reverse the selection status of all objects by using Edit > Toggle Selection—⇧T. Useful, for example, if you wish to select all objects except for a few. In situations where dozens or hundreds of objects exist, it's easier and faster to first select the "few" you wish to leave unaltered, and then choose Toggle Selection.

Selecting Following Objects

To select all objects which chronologically follow a selected one (or, if no object is currently selected, to select all objects after the current song position), choose Edit > Select all following—⇧F

Selecting Objects within the Locators (Vertical Selection)

Edit > Select inside Locators—⇧I—selects all objects lying completely or partly within the locators.

Selecting Similar or Identical Objects

If you have selected an object, you can use the Edit > Select > Select Similar Objects—⇧S—function, to select all similar objects and the Edit > Select > Select Equal Objects—⇧E—function, to select all equal objects.

This table will assist you in defining "similar" or "equal":

Object	*Similar*	*Identical*
Controller Event	Controller# equal, any data byte	Controller# and data byte (control value) equal
Note Event	Note equal, any octave	Note and octave equal

Selecting All Objects

To select all objects, use Edit > Select All—⌘A.

Deselecting All Objects

You can deselect all objects by clicking on the background, or by using the *Deselect All* Key Command.

1.12 Edit Operations

The Edit menus for Logic's various windows all take the same form. The first item is Undo. Below this, you'll find the typical clipboard functions (Cut, Copy, Paste), and at the bottom of each menu are the main selection commands.

1.12.1 Undo/Redo

Undo allows you to reverse the previous edit.

- The default Key Command for Undo is ⌘Z.
- The default Key Command for Redo is ⇧⌘Z.

Please also take a look at the *Undo/Redo* section on page 39, and also the *Undo History* section in the Reference manual.

1.12.2 The Clipboard

The clipboard is an area of memory into which you may cut or copy selected objects. These objects can then be pasted to a different position. The clipboard is independent of any particular song, which means that it can be used to exchange objects between songs.

Cut

All selected objects are removed from their current position and placed in the clipboard. The previous contents of the clipboard are overwritten in the process: ⌘X.

Copy

A copy of all selected objects is placed on the clipboard. The selected objects are also left in place. As with the Cut function, the previous contents of the clipboard are overwritten (⌘C).

Paste

All objects from the clipboard are copied to the top window. The clipboard is not erased in the process (⌘V).

The contents of the clipboard are added at the current song position (if they are events or Arrange window objects). The song position is incremented by the length of the pasted objects.

In the Arrange window, the contents of the clipboard are pasted to the selected track. If events are pasted in the Arrange window, either a new sequence is created for them, or the events are added to a selected sequence.

Any objects that previously existed remain unchanged.

Clear

Edit > Clear erases any selected objects. Clear has no effect on the clipboard and is functionally identical to pressing the ⟵ key (Backspace).

1.13 General Functions of the Editors

1.13.1 Opening Editors

There is a flip menu in the Logic Menu > Preferences > Global Preferences that allows the selection of the editor that will launch, when a sequence is double-clicked in the Arrange window. The flip menu options are: the Score, Event, Matrix or Hyper Editor.

1.13.2 Control Output via MIDI

Activating the MIDI Out button causes MIDI events to be sent when they are added, selected, or edited. This allows you to audibly monitor every edit, whether you are scrolling through the Event List (automatic selection) or lengthening or transposing a note.

1.13.3 Automatic Scroll Functions

... scrolling to the Song position

The walking man button activates the Catch function, which updates the window view to show the current song position.

... scrolling to the selected event

The *Scroll to Selection* Key Command automatically moves the window, so that the first of the currently-selected events is visible.

1.13.4 Setting Locators by Objects

The Functions > Object > Set Locators by Objects command allows you to set the locators in all Editors (and the Arrange) so that they encompass the currently-selected events. The Key Command can be found in the Key Commands window under *Global Commands*.

1.13.5 Deleting Events

These basic techniques are the same as for deleting sequences:

- the ⟵ (backspace) key deletes all selected events,
- the Eraser also deletes all selected events, and any events that you click with it (whether previously selected or not).

1.13.6 Display Functions

The View > Parameters (*Hide/Show Parameters—Key Command H*) function hides/shows the parameter boxes to the left of the windows, allowing an enlarged working area.

1.14 Key Commands

You can activate most of Logic's functions via Key Commands. A Key Command is a computer keyboard shortcut for a function or task in Logic. A number of functions are only available as Key Commands. The Key Commands window is used for the assignment of Key Commands to your computer's keyboard. The use of Key Commands allows you to customize Logic to suit your own working style, and will speed up your use of the program.

Your personal Key Commands are stored (along with settings made in the Preferences pages) in ~/library/preferences/info.emagic.logic ("~" means the path to your user's folder, e.g.: harddisk/users/username/.).

.

You should:

- make backups of these files elsewhere on your hard disk;
- make a floppy disk, ZIP or CD backup of them should you need to use Logic on another computer.

When you install updates for your version of Logic, your personal Key Commands will not be overwritten.

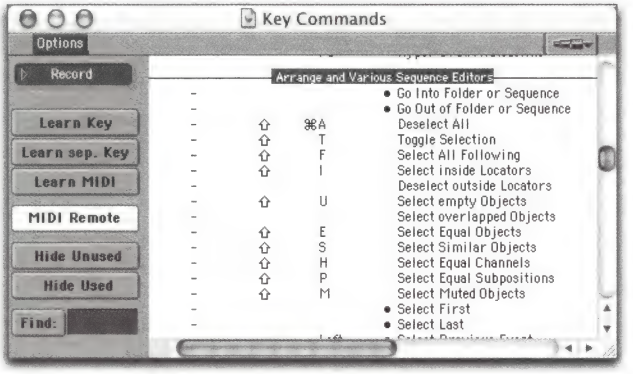
1.14.1 Special Keys

Some keys have special functions:

- The modifier keys ⇧, ctrl, ⌥, and ⌘ can only be used in conjunction with other keys. Given the differences in some Macintosh keyboards, we have included the following:
  The ⇧ key = Shift.
  The ⌥ key = Option.
  The ⌘ key = the Command key.
- The ⌫ key has the fixed "delete selected objects" function. It can only be assigned to another function in conjunction with the modifier keys.
- The + and − keys increase or decrease any selected parameter value in single units. However, they *can* be assigned different functions which overwrite this default behavior.

1.14.2 Key Commands Window

The Key Commands window can be opened by selecting Logic Menu > Preferences > Key Commands or by pressing ⌥K.



All Key Commands are listed to the right of the Key Commands window. They are grouped in the following categories:

- Global commands
- Functions affecting all windows (Various windows)
- Functions affecting the Arrange and all other Editor windows (Arrange & Various Sequence Editors)
- Functions for the Arrange window specifically (Arrange)
- Functions for the Environment window (Environment)
- Functions for the Score Editor (Score window)
- Functions for the Event List Editor (Event window)
- Functions for the Hyper Edit window specifically (Hyper Edit)
- Functions for the Audio window (Audio window)
- Functions for the Sample Editor (Sample Edit Window)
- Functions for the EXS 24 Instrument Editor (EXS24 Instrument Editor)
- Functions for the Note Step Input (Keyboard Input).
- Functions for the Project Manager (Project Manager)
- Functions for the Setup/Install and Controller Assignments windows—only relevant if you use an external MIDI controller that is directly supported by Logic.

An asterisk or dot which precedes the function description indicates that the function is *only* available as a Key Command. To the left you can see the currently assigned key/key combination.

Assigning a Function to a Key

- Click on the *Learn Key* button.
- Select the desired function in the list by clicking once on it with the mouse.
- Press the desired key on your computer keyboard, plus the modifier keys: ⇧, ctrl, ⌥ and ⌘.
- To create further Key Commands, repeat steps 2 and 3.
- Deactivate the *Learn Key*!

Deleting Key Command Assignments

- Click on the *Learn Key*.
- Use the mouse to select the function with a key assignment that you wish to delete.
- Press ⌫.
- To erase more assignments, repeat the second and third steps.
- Deactivate the *Learn Key* button.

Checking the Function of a Key

Deactivate the *Learn Key*, and press the Key Command (or combination of keys) that you want to check. The associated function will be highlighted, and displayed in the middle of the window.

Filtering the Display

You can use the *Hide Used* and *Hide Unused* buttons to hide all used, or unused, Key Commands. All other Key Commands window functions remain available for your use.

Finding Key Commands

Due to the large number of possible Key Commands, it can sometimes be difficult to find a particular function. To aid in this regard, Logic offers a *Find* function, which allows a search for a specific Key Command by typing in its function name (or a part thereof) or by entering a character string, i.e. the Key Command itself.

Simply click in the white space to the right of the *Find:* button and enter the string of characters (or function) you're searching for. The window will update to display all Key Commands containing the character string (plus the selected command, even if it doesn't contain that string) when the *Find* button is clicked or the ↵ key is pressed.

The *Find:* button switches Find mode on and off. The button is automatically activated if a string of characters is entered in the text field.

The Key Commands window remains active, even in Find mode; you don't need to leave this mode to continue making assignments.

The Find function is not case-sensitive and makes no distinction between upper and lower case characters.

The *Hide Unused* and *Hide Used* buttons work in combination with Find. This means that you must switch off both in order to see *all* commands that fit the search criteria, regardless of the commands' current assignment.

1.15 Controlling Windows—Screensets

Every song created in Logic can have up to 90 "Screensets". Screensets are window combinations which can be customized by you and stored to a specific numeric key/combination of keys on your computer keyboard. Each Screenset remembers the type of edit or Arrange window/s opened plus size, position and zoom settings. This facility accelerates your workflow massively and allows you to tailor Logic to fit your needs and tastes.

To Set up a Screenset

- Press any of the numeric keys above your computer keyboard (you can also use the numeric keypad, if available).
- Open the desired windows by selecting them from the Windows menu, or by using the appropriate Key Commands.
- Resize, zoom and reposition your selected windows to meet your needs.
- Press the numeric key again.

This will only work for keys/Screensets 1 to 9.

Tip

To Set up More than Nine Screensets

Press the ⌘ + numeric keys.

Tip

You can *not* use the number "0" for any of your Screenset combinations. The reason is that number 0 is assigned for the Transport Bar *Stop* function, using the computer's keyboard (or *Play* on Mac OS).

To Lock Screensets

- If you want to ensure that your Screensets remain as you intended, you should always lock your Screensets by pressing ⇧L. The "lock" also includes zoom settings, catch mode and the visible area.

1.16 Song Administration

All events, other objects and settings (apart from the Preferences and Key Commands) are components of a song. Songs are handled in the File menu.

There is also a window called the Project Manager in Logic. This window handles all of the "media" file types that Logic deals with—audio, video, settings etc. in "projects". This is a more advanced topic that is covered in the Reference Manual, but we just thought we'd mention it here as you will see a Save as Project entry in the File menu. You will also see a few import and export options in there as well. As we are only concentrating on the "basics" with this Introduction Manual, these options won't be discussed in the following section. By and large, these functions are aimed at transferring Logic songs/projects to other applications/systems. More can be found on the Import/Export options in the Reference Manual and online Help system.

1.16.1 New Song

When you first launch Logic, after completing the *Logic Setup Assistant* (LSA) procedures, it opens a default song based on the selections made in the LSA. This song can be further customized to match your needs and tastes for use in future projects. Once you have learned how to set up your own "default song", by following this Getting Started, you should save it in the Logic program folder, and name it "Autoload".

Autoload Song

If a song called "Autoload" exists in the Logic folder, it will automatically be loaded when Logic is launched. We will discuss the creation of an Autoload song in the next chapter. When you're ready to start work on a new song, simply save the Autoload under a new name using File > Save as ... and begin, or perhaps make use of the Project Manager.

Creating a New Song

If you select File > New, Logic checks to see if an "Autoload" song is available and opens it automatically if found. If not, a new default song is created. This is based on the information provided by you to the *Logic Setup Assistant*.

Opening the Default Song

If you hold down the ⌥ key while selecting File > New, a new default song called "Untitled" will be opened.

1.16.2 Loading a Song

File > Open will launch the standard file selection dialog for your operating system. Simply browse to the required song file.

1.16.3 Checking/Repairing Songs

If you double-click on the Transport Bar's free events display, the memory will be re configured. At the same time, the current song will be checked for any signs of damage, structural problems and unused blocks.

If any unused blocks are found—which normally shouldn't happen—you will be able to remove these, and repair the song.

1.16.4 Saving Songs

When you select File > Save the current song will be saved with its current name intact. In the case of the Autoload song, you will be prompted for a different name. You can, however, freely save over the Autoload.

If you don't wish to overwrite the most recent version of this song saved under this name (which is what will happen if you use the File > Save, command, use File > Save As ... Here, you can enter a new name for the song (and select a new directory or even create a new folder). The next time the straight Save command is used, the new file name and path will be used.

1.16.5 Closing a Song

File > Close closes the currently active song. If you have made any changes since the song was last saved, Logic will ask if the song should be re-saved before closing, to preserve any changes you may have made.

1.16.6 Quitting the Program...

Choose File > Quit to exit the program. If you have not saved any changes made to the open song file/s, you will be asked if you wish to do so before quitting (press ↵ to save).

1.17 The Transport Bar

The Transport Bar is used to "transport" you to different points in your song. The buttons—from left to right are: Record, Pause, Play, Stop, Rewind and Fast Forward. These work as per those on a tape deck. The record button, to the left, is used for recording both MIDI and audio data (on any currently *armed* track), selected in the Track List. The cycle, drop and other buttons will be explained as we work through the Getting Started.

- The SMPTE/Bar Position area indicates the current bar number occupied by the Song Position Line. In the figure above, the display shows 1 1 1 1, which means: first bar, first beat, first 16th and first clock pulse. The time position, 00:00:00 etc. means—0 hours, 0 minutes, 0 seconds, 0 milliseconds/frames a.s.o.
- The lower two sets of numbers, from top to bottom, are the left and right Locators, which are used for setting cycle region points, which will be discussed shortly.
- The Tempo display indicates the tempo accurate to 1/10,000 of a Beat Per Minute.
- Beneath the tempo, the maximum number of MIDI events that it would be possible to record on this particular computer is indicated.

- The /16 below the Time Signature of 4/ 4 indicates the format for note and bar display, so that any edits you may perform on your MIDI or audio data can be carried out with more precision. The /16 refers to the number of divisions in the bar. Click and hold your mouse button, and drag up or down to change this value.
- The MIDI Activity display shows all MIDI input and output and also serves as a "Panic" button. If you have hung notes you can click once in the MIDI Activity Window to send a MIDI reset message, or double-click to send a Full Panic Reset which systematically works through all MIDI channels and ports and resets all connected MIDI devices. This guarantees absolute silence.
- The Song End box displays the bar number at which the song will end and sets a maximum song length. By default this is set to 201 bars.
- Clicking on the downwards pointing arrow beside the Song End box will open a menu of Transport Bar display options, which will allow you to customize the appearance of the Transport bar to meet your requirements. We suggest that you select "Legend" which will turn on the function titles, as shown in the image above, at least while learning Logic.

1.17.1 Transport Key Commands

By default, there are several Key Commands assigned to the transport functions. They are assigned to the numeric keypad of your computer keyboard. ⌧ must be deactivated for them to function using the numeric keypad. See the following chart for these commands, and try to remember and use them while working through the Getting Started.

Key	*Command*	*Powerbook Key*
0	Stop (if stopped: Return to Zero)	↵ (Return)
↵	Play (if playing: play again)	↵ (Enter)
*	Record (if recording: record again)	\
,	Pause (toggle)	⌘↵
␣ (Space)	Play/Stop (toggle)	␣ (Space)
/	Cycle (toggle)	/
=	Set rounded Locators by Objects	'

1.17.2 Simple Science...

That's about as technical as this Introduction Manual gets. We don't want to blind you with science, we just want to help you get up and running with Logic.

Where necessary, we will offer tips and explanations of features and functions, but most of the time you will learn by doing. Please refer back to this chapter if you forget how to use any of the tools, menus or other functions. If, at any stage, you would like to get detailed technical or other information on any feature or term discussed, you can use the Reference Manual supplied with your version of Logic.

Take as much time as you need to complete each task, and have fun experimenting with the supplied song files.

Your Emagic Team

2 The Ideal Workspace

This chapter looks at Logic's general structure, the Logic Setup Assistant, the Environment window and some examples of how you can further customize your workspace.

Once this groundwork has been done, you will have a default working song file that can be used as a basis for all of your future projects. This will be known as your "Autoload" song.

Furthermore, you will learn how Logic communicates with audio and MIDI hardware and will start making your first experimental musical steps.

Before we get to the Logic Setup Assistant and Environment window, we'd like to briefly cover some conceptual information. This will aid you in understanding the structure of the program, and the relationships between windows in Logic.

2.1 3-dimensional Software

Logic has a structure unlike most software you may have used. Where Logic is different, is that it features several "levels" to its architecture. If you compare this to other Mac OS software, you can open several documents or "windows", in which you can view and edit content. But there is no relationship between these windows. In Logic, all windows are linked and interact with each other.

Let's take a look at Logic's different windows and levels:

- The Arrange window is where you construct your arrangements and songs. In the Arrange window you deal with *folders* and with *MIDI sequences* or *audio regions*. *Folders* can contain *MIDI sequences* or *audio regions* or other *folders*. The *MIDI sequences* contain *MIDI events*. You do not deal with *MIDI events* or audio *files* directly. You do this in the different Editors.

Tip

Screenset 1 will open the Arrange window. This is the default set by the *Logic Setup Assistant*.

- In the Editors, folders, MIDI sequences and audio regions can be opened to look at, and directly manipulate, the raw MIDI data—notes, controllers, sysex messages etc.—and the underlying audio *file* on which the *audio region* is based. The editors allow you to go into the depth of your composition—from the top level of the Arrange to the folders to the atomic level of notes and audio files. Let's take a closer look at two of the editors.
- The Score editor allows you to switch between viewing a score part for a single track, an individual sequence, a group of tracks, and the entire song. This allows you to define what you would like to see onscreen and what parts you would like to print—without changing the MIDI data.

Tip

Screensets 6 will open the Score window. This is the default set by the *Logic Setup Assistant*.

- Similarly, the Matrix editor allows you to simultaneously view the contents of a single sequence, all sequences on a track, or all sequences in a song, or song section. Viewing the contents of multiple sequences allows you to quickly see, and change, overlapping notes, velocities and more on multiple MIDI channels.

Tip

Screensets 5 will open the Matrix editor window. This is the default set by the *Logic Setup Assistant*.

- Finally, there is the Environment, in which the Logic sequencer is connected to its MIDI and audio environment. The Environment can be divided into layers for an improved overview, and easy access to your instruments. For example, you would normally have an Environment layer for your JV1080, another layer for your Nord Lead, another for your Virus, and another for your audio hardware.

Tip

Screensets 3 will open an Environment window, showing the "Audio" layer with the mixer. This is the default set by the *Logic Setup Assistant*.

These "link" buttons (chain symbol) are found to the top left of all of Logic's windows. Their function is to keep the various windows "linked", regardless of which *level* in the song architecture you happen to be working on—Arrange, Edit etc. You will learn more about the practical uses of these buttons—and the walking man icon found alongside these buttons—as you work through the Introduction Manual.

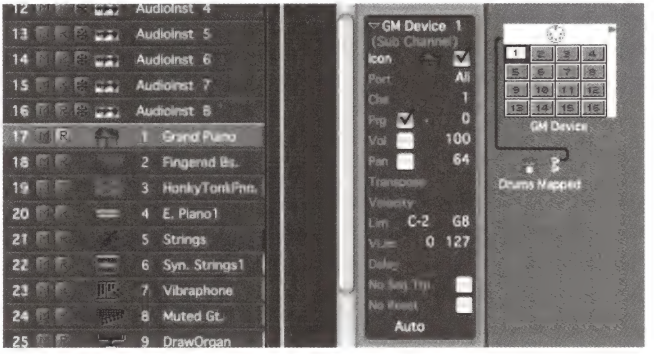
As you work with Logic, you'll see the interaction between windows, and will learn the practical use of the levels and layers we've discussed. You will find that this method allows each window to perform a particular task efficiently. Key to Logic's operation, and truly unique in the music software world, is the Environment.

2.2 The Environment Concept

Logic's Environment window—accessible from the Windows menu—is Logic's "brain". Its primary purpose is to get MIDI and audio information into, and out of, Logic.

The Environment has a direct relationship to the Arrange window's Track List: Each track has a destination, and this destination is an object in the Environment. This is illustrated by the following diagram.

Important!



The Arrange window Track List is shown to the left, with Track 12—Grand Piano selected. This track corresponds to MIDI channel 1 of the GM Device shown in the Environment to the right. Note that the number 1 button in the GM Device graphic is depressed. If Track 13, the Fingered Bass were selected, the Environment window would update to reflect this selection, and button 2 would be depressed in the GM Device. The automatic updating of the GM Device in the Environment window is due to the "linking" discussed earlier in this, and the first chapter.

2.3 The Data Flow

Important!

The Environment allows you to set up an onscreen "flowchart" which represents the functions and facilities of your connected MIDI equipment. On a basic level, you can simply define your "instruments" onscreen and route them to a MIDI port—which is handled for you automatically by the *Logic Setup Assistant*.

If you're more adventurous, you can incorporate additional onscreen tools, such as arpeggiators, MIDI delay lines and more to your Environment. These additional tools, plus your onscreen "instruments" are collectively known as "objects" in the Environment. The Environment can even be used to create extremely flexible *real-time* MIDI data processing "machines", including step sequencers, rhythm generators and more.

The key word and concept to keep in mind when dealing with the Environment is "flowchart", no matter how simple or complex your Environment is, or becomes. The Environment allows you to clearly define how you want your MIDI data flow to be sent *to* and *from* your physical MIDI devices.

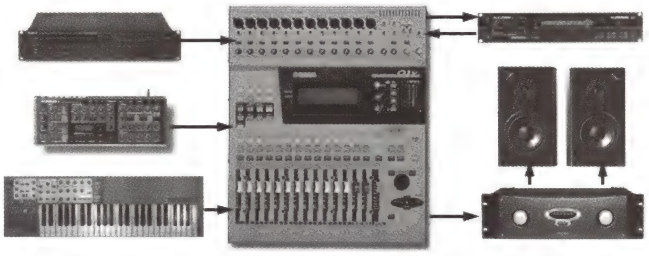
But the Environment does not stop with MIDI: You can also set up audio "objects" for your individual audio output, input, audio instrument, bus and master fader channels. The creation of a number of these audio objects, plus the routing of signals between them is *automatically* taken care of by the *Logic Setup Assistant*. You don't need to set up anything before making use of the audio functionality of Logic.

But the Environment does not stop with MIDI: You can also set up audio "objects" for your individual audio output, input, audio instrument, bus and master fader channels. The creation of a number of these audio objects, plus the routing of signals between them is *automatically* taken care of by the Logic installation procedure. You don't need to set up anything before making use of the audio functionality of Logic.

Logic also allows the interaction of MIDI and specific audio objects in the Environment, which we'll discuss later.

2.3.1 Getting Started

As you're probably familiar with audio mixers, we thought it would be helpful to discuss the flow of audio signals as a point of comparison to the data flow in the Environment. Take a look at the following image.



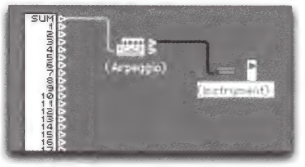
As indicated by the arrows, audio signals run *out* of the synthesizers to the left and run *in* to the mixer in the center.

Signals run *in* and *out* of the mixer into/from the effects unit to the top right. This is often called an "effect loop" and is used to route the signals of the three synthesizers (as a group or individually) *in* to the effects unit (via the mixer's *effect send*). After being processed by the effects unit, they will be sent back *in* to the mixer (via the mixer's *send return*).

MIDI signal flow is no different, in concept at least, to the audio example above. It must be sent *out* of one device and *in* to the next device in a "chain", just as with audio. Let us show you what we mean, and please give this a try.

- Launch Logic, if it isn't already running by clicking on the Logic icon in your Logic program folder.
- From the Windows menu, click hold and scroll down to the Environment listing or use Screenset 3 of the default song created by the Logic Setup Assistant. This will open the Environment window.
- In the Environment, you'll see the words "MIDI Instr." on the left-hand side of the screen in the Layer flip menu (in the diagram it is shown as "(unnamed)").
- Click-hold in this box and in the flip menu which opens, select *Create*. This will display a blank Environment *layer*.
- Click on the New menu and select Physical Input from the listing. Release the mouse button and a new physical input icon will be generated onscreen. (Yours may look different to that shown below as this is dependent on the type of interface used).

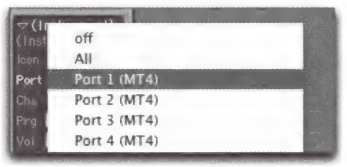
- Click on the New menu and select Arpeggiator.
- Click on the New menu and select Instrument. You will now have three icons onscreen.



- Connect the cables as shown, ensuring that you cable from the *Sum* output of the Physical Input object.
- To create a cable, click and hold on the small triangle found at the top right of each icon and drag the mouse/cable (which will appear onscreen automatically) *in* to the target icon. You will know that the connection has been made when the target icon turns white. Once you've made the connection, release the mouse button.
- If no triangles appear to the top right of your icons, click-hold on the View menu, and select the Cables entry. If you still have problems, select View > Protect Cabling and Positions.

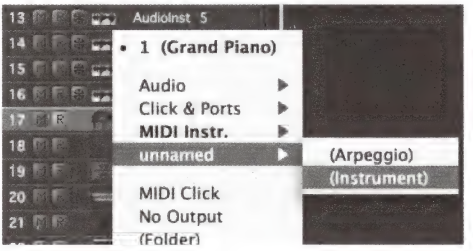
Tip

- Click once on the Arpeggio object and, in the parameters box to the left of the screen, change the settings to match the following: *Direction—UpD2*, *Res—1/16*, *Length—1/32*, *Octaves—3*.
- Route the "Instrument" object to a MIDI *out* port that is active. You'll find this on the left of the screen in the parameters- as shown in the diagram below. Click and hold in the space between *Icon* and *Cha*, and select an available MIDI port from the flip menu. Once again, the appearance may be slightly different on your machine, dependent on the MIDI interface used.



- Close the Environment window.

- Select the "Instrument" MIDI track in the Arrange Window by click-holding on any of the instrument *names* in the Track List. This will open a hierarchical menu as shown below.



Take a moment or two to scroll through the hierarchical menu. You will notice that the Instrument and Arpeggiator objects you created in the Environment also appear in this list—under the "unnamed" menu entry. This is a key point to understand. All objects you create—on *any layer* in the Environment: in this case the "unnamed" layer—will be available for selection and use in this hierarchical menu, and therefore in the Track List. In other words, the two are connected, and without objects in the Environment, the Track List will be full of "null" (No Output) objects.

Important!

You can prevent objects from appearing in the list by unchecking the *Icon* checkbox in the object's parameter box in the Environment.

Tip

Another point to consider when selecting an output object—i. e. an Instrument—in the Track List, is the underlying routing of the Instrument within the Environment. If you select an Instrument on a track that has an arpeggiator routed *in* to it, for example, then all MIDI data on the track will be sent via the Instrument. If, on the other hand, the arpeggiator object was selected on a track, the data recorded on the track would be sent via the arpeggiator and fed, in turn, to the connected Instrument. This would result in the arpeggiation of the data.

Important!

Back to the example. This routing does nothing exciting until you hit the *Play* button on the Transport Bar and hold down a chord on your keyboard. Try it!

While doing so, we ask that you pay attention to the top right-hand field of the Transport Bar. This is the MIDI activity indicator which displays MIDI input and output. Once you've had a little fun, press the *Stop* button on the Transport Bar.

This is one of thousands of possible routings, but is a simple example of how the *signal flow* works.

Expanding this Example

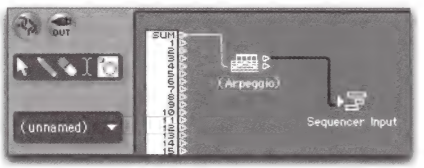
Tip

Open the Environment layer you just created by double-clicking on the "Instrument" track in the Arrange window's Track List. This will automatically launch the Environment window, and will select the layer and Instrument object itself. As you can see, the signal is routed from the Physical Input object directly *in* to the Arpeggiator object.

Important!

In Logic's Environment, the *Physical Input* object is actually the equivalent of your real-world hardware MIDI In ports. Click on the New menu, and slowly scroll through the various options. You will find a Sequencer Input object amongst the items listed. The *Sequencer Input* object that appears onscreen is actually the software input for Logic (the "door" in to the program, if you like)

- Connect your cables as shown.



- To disconnect the existing cables from the previous example, simply click on the *cables* and drag them to the new destination.
- To completely disconnect the cable connection between objects, simply click on the cable and drag it back on to the source—i.e. the icon it's routed *from*.

Tip

- Once done, close the Environment Window.
- Now, if you press the *Play* button on the Transport and play a chord on your keyboard, it works just as it did before with one exception—the MIDI In on the Transport works.
- Once you've experimented a little with this, press *Stop* on the Transport.
- If you press the *Record* button on the Transport and play a chord, your arpeggiated data will be recorded. Give it a try, and note that as the recording takes place, a new sequence will be created in the Arrange window and displayed as a horizontal rectangle.
- Once you're done with the recording of your arpeggio, press *Stop* on the Transport Bar.

Sit back and consider this for a moment, and take a look at the signal flow. In both examples, the data was routed from the actual MIDI port—i.e. the Physical Input object—into the Arpeggiator object, where it was processed.

Important!

Please Note: The only way to *record* MIDI data into Logic is via the Sequencer Input object. As shown in the first example, it's possible to process MIDI data via the Environment without Logic "seeing" any MIDI input.

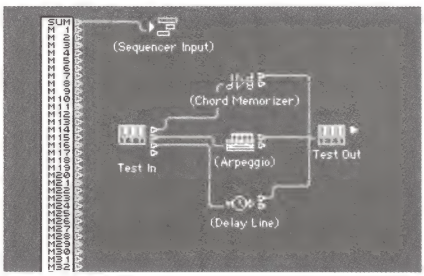
As a scenario where the ability to process MIDI data before it enters Logic (via the Sequencer Input object) may be practical, consider this: You have a basic MIDI keyboard that can only transmit on one channel at a time—e.g. a DX 7—but want to split/layer it in order to access and control multiple channels of a connected sound module simultaneously. In this scenario, you could set up your keyboard's "phantom" controller functions in the Environment before the Sequencer Input object. Everything subsequently performed would be processed—i.e. split/layered/transposed etc.- prior to being recorded and would sound and work in the desired fashion.

Tip

It is also possible to set up similar functionality after the Sequencer Input object, although the routing would be very different. Some things, however, are difficult (if not impossible) as post Sequencer Input processes and vice-versa. As a rule, the arpeggiator would generally be used post (after) the Sequencer Input, and would normally be routed directly *in* to an Instrument. In our example, all MIDI note data entering Logic would be arpeggiated, which wouldn't be great for many (or any) styles of music.

Parallel Processes

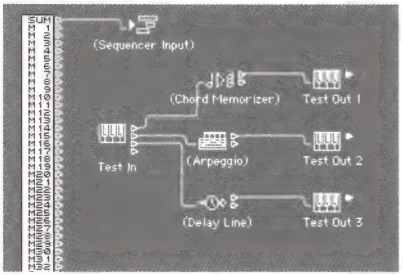
It's possible to route the MIDI signal through multiple processes in parallel, much like you would in a multi-effects processor.



The diagram shows a parallel routing scheme, post the Sequencer.

If you follow the flow of the signal in the diagram, you'll see a standard recording setup—the Physical Input runs into the Sequencer Input object, several other objects are connected independantly.

Not quite as standard in the example shown above: Any MIDI note input played or recorded on the "Test In" Instrument track—selected in the Arrange window's Track List—will be routed through the Arpeggio, Delay Line and Chord Memorizer objects. All processing done by these objects will be routed to the "Test Out" object and will only affect its MIDI port/channel.



The diagram shows a slightly modified parallel routing scheme, post the Sequencer.

If you slightly modified this example, it would also be possible to route the data from each of the Arpeggio, Delay Line and Chord Memorizer objects to separate Instrument objects—e. g. "Test Out" 1, 2 and 3. This would mean that the data routed from the "Test In" track could be sent via the Arpeggiator to a synth "pluck" sound, the Delay Line to a bass sound, and the Chord Memorizer to a synth pad, for example.

As you can see, there is no cable between the *Sequencer Input* object and the "Test In" *Instrument* object. You may be wondering what happens to the MIDI data if the signal flow chain is "cut", as it appears to be, between the *Sequencer Input* and the *Instrument* object. Here's what happens:

Important!

Logic sees all MIDI data arriving at the *Sequencer Input*. The program routes any incoming data, in realtime, to the track you have selected in the Arrange. As the "Test In" *Instrument* object is selected as the track destination, the signal flow is not interrupted.

Once MIDI data has been *recorded* into Logic via the Sequencer Input, it will be stored within a MIDI sequence. The data within this sequence can then be directed to virtually any Environment object, via the track's destination.

A Quick Recap

So far, we have covered some key Environment concepts, which are condensed as follows:

- The Environment's primary purpose is to get data into and out of Logic.
- The Environment represents physical MIDI devices and some of their functions via onscreen icons.
- The Environment contains additional processing tools, which can alter MIDI data in real-time.
- The Physical Input object represents your MIDI interface's INPUT ports.
- The Sequencer Input object is used to (and is the only way you can) *route* MIDI data into Logic.
- Once data has entered Logic via the Sequencer Input port, the program can redirect this data to almost any object that exists in the Environment.
- All objects you create—on any layer in the Environment—will be available for use as track destinations in the Arrange window's Track List. MIDI data, stored as sequences in the Arrange window, can thus be routed to any port, channel, instrument or to/from another object.
- Some objects, such as Instrument objects, can be routed to a MIDI output port with no need for any cabling.

As shown in these exercises, the main thing you need to do when in the Environment is to follow the signal flow. Think carefully about what you want to happen to your data, plus when and where in the signal path you want it to happen. It really is that simple!

2.4 Logic Setup Assistant

Logic offers a number of *universal* objects in the Environment window, which are used to represent your physical MIDI devices.

When you first ran the Logic Setup Assistant (or if you're about to do so) you would have encountered a panel that asked you to identify the *Manufacturer, Device Model* and *MIDI IN* and *OUT* ports for each unit in your MIDI rig.

This portion of the Logic Setup Assistant procedure will automatically create named "universal" objects that represent the devices you selected. All will automatically be "connected" to the appropriate MIDI output ports in Logic... so you can get on with making music straight away!

Should you wish to further enhance your Environment, after reading through this section, we would suggest that you take your time. This will give you the time to read the Environment chapter in the Reference manual, and time to learn how *you* want to use Logic, which will place you in a better position to then customize the program to meet your needs.

You may wish to skip ahead to the *Using Logic* chapter, from page 75 onwards. You can always return to this chapter at a later stage, should you wish to customize, or add to, your Autoload song. We ask that before you skip ahead, you take a look at the *Activating Channels* section on page 62.

2.5 Customizing

Customizing a Multi Instrument Object

Once you've set up a Multi Instrument (or several) with the *Logic Setup Assistant*, there are a number of changes you can make to it which aid in the use of Logic. Following is information on how to make these customizations. While changing the colors and icons aren't absolutely *essential* changes, it won't hurt. We do, however, strongly recommend that you make changes to the patch list names within the Multi Instrument. Selecting patches by name is much easier than trying to deal with program change numbers.

Activating Channels

The *Logic Setup Assistant* automatically creates a number of Multi Instrument objects that represent your physical MIDI devices—keyboards, modules etc.

Not all MIDI instruments are multi-timbral, however, and many that are, are not 16-channel multi-timbral. As examples, the Waldorf MicroWave XT is multi-timbral, but only on 8 MIDI channels. Similarly, the Kawai K5000R is only four part multi-timbral. The original Yamaha DX7 only reponds on one MIDI channel at a time—i. e. it is not multi-timbral.

To keep Logic's menu lists neat, and to avoid any confusion, you should only activate as many channels as each individual MIDI instrument can actually receive. To give you an example, if you own a JV1080, you would activate all 16 channels in the Multi Instrument that represents it in Logic. If you own an Ensoniq ASR10, you should only activate 8 channels in the Multi Instrument. Here's how you activate (and deactivate) channels in Multi Instruments.

- Open the Environment window.

- Within any Multi Instrument, activate the appropriate number of channels, by clicking on each numbered square in the grid. Ensure that you only activate as many channels as necessary—i.e. as many channels as your MIDI device is capable of playing simultaneously.
- Repeat for each device.
- Once all desired Multi Instrument channels have been activated, save the song as "Autoload" in the main Logic program folder, by selecting File > Save As... and typing in the name.

To deactivate a channel, if you make a mistake.

- Click on the "extra" channel—e.g. channel 9 in a Multi instrument that represents an 8-channel multi-timbral device.
- In the Parameters Box to the left of the screen, you will see a checkbox alongside the word Icon.
- Click in the checkbox, and keep an eye on the "grid" on the front of the Multi Instrument object. Easy huh?

Object Color

When recording, the sequence objects in the Arrange window can automatically be assigned a color, which makes viewing and managing tracks much easier.

- Select a sub-channel in your Multi Instrument by clicking on the corresponding number within the Multi Instrument "grid".
- From the View menu, select Object Colors, or use the Key Command. This opens a floating color palette which allows you to assign a color to each channel.
- Simply select each channel, by clicking on it with the mouse, and then the color for each channel—again with a mouse click.
- When you're done, close the Color Palette via the close window button in its top left corner .

Tip

You can change the color or the icon of all sub-channels by selecting the icon above the grid, and changing the color or icon.

Instrument Icon

While you're selecting your sub-channel colors, why not assign icons for each as well? Again, a convenience which makes it easier to keep track of your Instruments and their channels.

- Select a sub-channel in your Multi Instrument by clicking on the corresponding number within the Multi Instrument "grid".

- In the parameters box to the left of the Environment, click-hold on the icon itself. This will open a flip menu, from which you can select an icon of your choice.

- Simply select each sub-channel, then the icon for each channel.

Tip

You can prevent objects (including sub-channels in Multi Instruments) from appearing in the Arrange window Track List, by unchecking the *Icon* checkbox. This is also useful for hiding/disabling a sub-channel that has been activated by mistake.

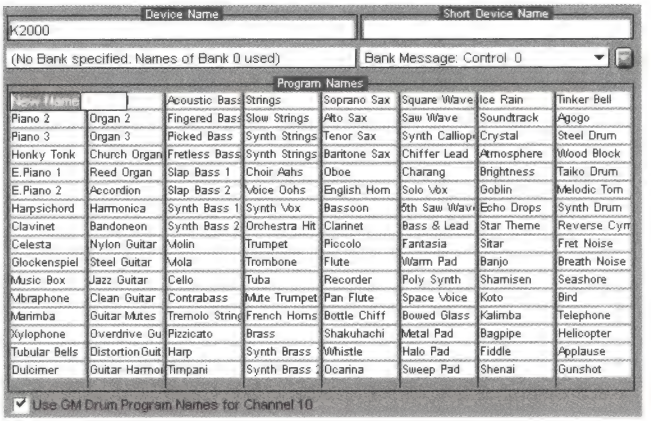
Instrument Name

Select the name tool, highlighted in the toolbox to the left of the image below, then click in the space shown below the Multi Instrument and type in an appropriate name for your MIDI device—if the name created by the *Logic Setup Assistant* isn't to your tastes.

Patch Names

Rather than selecting patches via meaningless—and difficult to remember—program change numbers, you can select patches stored in your synth's memory by name. To customize patch list names for your Multi Instrument:

- Double-click on the icon at the top of the Multi Instrument. (It looks like a MIDI port.) This will open a window similar to the image shown below.



- To rename the default patch list entries, simply double-click on the names—one by one—and type in the appropriate patch name. Note the "New Name" entry to the top left of the list.
- Following the naming of each entry, press ⏎, or simply use your mouse to double-click on another entry.
- When finished, close the Multi Instrument patch list.
- Repeat all steps for the creation (and customization) of *each* Multi Instrument object which corresponds to the physical MIDI synth/modules in your studio.

Tip

You can also type out a list in TextEdit or your word processor, and use the copy/paste options, accessible via the downwards arrow to the right of the *Bank Message* flip menu.

Advanced Patch List Function—Bank Select

Many synthesizers contain more than 127 sounds. If you own a device of this type, this section—and possibly the next—will be of interest, and use, to you.

As an additional function, accessible from the patch list window, you can assign patches to other *banks* of sounds (up to 14) by using the *No. Bank specified* and *Bank Message* flip menus. This will allow you to access patches beyond the standard 127 allowed by MIDI—obviously dependent on your synth's capabilities.

To activate new banks—select any of the 14 possible banks from the *No. Bank Specified* flip menu. Most modern synthesizers use Bank Message: Control 32, so it's unlikely that any changes will need to be made in the *Bank Message* flip menu. We suggest that you take a look at this flip menu, as some specific synthesizers and modules are listed here, which use a different bank select protocol. If you own

a synthesizer which is named in the list, select it with the mouse. If you own a synthesizer which has multiple banks, but does not use the standard Control 32 (or Control 0) message for bank select, please refer to the following *Custom Bank Messages* section.

Each of the new banks will have its own patch list which, by default, will use the names of the first bank. To rename the patches, please follow the instructions

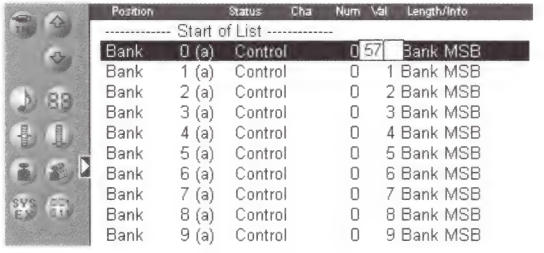
Do *not* use the *Bank* functions if you only have one bank of patches in your synth. Initializing new banks requires the use of more memory for the object, thereby making the object, and subsequently your song files, larger.

Tip

Custom Bank Messages

Should you own a synth with an unusual scheme for bank selection, you will need to set up "Custom Bank Messages". Here's how to do it without trying to understand the hexadecimal listings found in the back of your synth's manual.

- Select New > Monitor.
- Run a cable *out* of the Physical Input's Sum port *in* to the Monitor object.
- Cable from the Monitor object *in* to the Sequencer Input object.
- Select the various banks from the *front panel* of your synth, using its buttons/menus.
- Write down the various numbers that appear in the Monitor objects' window, each time you press the buttons on your synth.
- Once you've done this for each bank in the synth, select the Multi Instrument object, and choose the Options > Define Custom Bank Messages function. A window which looks like the diagram below will launch.


Position Status Cha Num Val Length/Info
---------- Start of List ----------
Bank 0 (a) Control 0 57 Bank MSB
Bank 1 (a) Control 0 1 Bank MSB
Bank 2 (a) Control 0 2 Bank MSB
Bank 3 (a) Control 0 3 Bank MSB
Bank 4 (a) Control 0 4 Bank MSB
Bank 5 (a) Control 0 5 Bank MSB
Bank 6 (a) Control 0 6 Bank MSB
Bank 7 (a) Control 0 7 Bank MSB
Bank 8 (a) Control 0 8 Bank MSB
Bank 9 (a) Control 0 9 Bank MSB

- Double click in the *Val* column, and type in the numbers that you've written down for *each* bank and you're done.

- You will need to type the appropriate patch names into the patch list (as discussed in the *Patch Names* section, from page 64 onwards), should you wish to select patches by name in these higher banks.

Once set up, whenever you choose a program or bank from the *Track Parameters* box in the Arrange window, it will automatically send the appropriate bank/patch number to your connected MIDI device.

As always, after making any customizations to your Multi Instruments, ensure that you save your song.

Important!

2.6 About Audio Objects

By default, a number of audio objects were created when your first installed the program and ran the *Logic Setup Assistant*.

We recommend that you do not create further audio objects of any type until they are actually required for a project, and until you have a better idea of how and what they are used for. The creation of additional audio objects increases the need for system resources, placing undue strain on your computer. In other words, creating 64 audio playback tracks "because you can" is pointless and wasteful if you only require 8 audio playback tracks.

Important!

As mentioned in the preceding paragraph, Logic features several "types" of audio objects. These different *types* are based around the same fundamental Environment object—namely the Audio object—but each has distinct facilities. The "cabling" between audio objects—which deals with the audio signal flow—is automatically (and invisibly) connected by Logic, as new audio objects are created and assigned. This invisible cabling follows a fairly standard signal path, normally found on a mixing console, with audio channels, busses, master faders etc. As such, the Logic mixer will immediately be familiar to you if you've had any experience with mixing consoles.

All audio objects, with the exception of the Master Volume fader, accept the use of software "plug-ins". Plug-ins are DSP (Digital Signal Processing) algorithms which are processed by the computer's CPU. These algorithms can include audio effects such as: reverb, chorus, flanging, compression, equalization and many more processes. A special Audio object "type"—the Audio Instrument—allows the use of software plug-ins which emulate synthesizers, samplers and drum machines.

This section will explain what the different audio object types are, and what they are used for.

Audio (Track) Object

The Audio object is, as mentioned, the fundamental object used for audio functionality in Logic's Environment. By default, any Audio object created will be assigned to the first available *playback* channel, or "Audio Track".

Audio Input Object

As the name suggests, the Audio Input object allows the processing of audio streams entering Logic. This means that incoming audio can be monitored (i.e. heard) with effects. A separate Audio Input object can be created and assigned for each physical input (or input pair) of your audio interface hardware. Note that Audio Input objects do *not* need to be created, in order to get audio in to Logic. These objects simply allow the *processing* of audio on input.

Audio Bus Object

This is just like a bus/group on an audio mixing console. It acts as a send/return for Audio Track (playback), Audio Input and Audio Instrument objects, when effects are inserted. It also acts as a "group" fader, where multiple audio channels can be routed to it, and volume or pan can be adjusted globally for all "grouped" channels. You can also "group" faders via Logic's excellent grouping facility. More on this can be found in the Reference Manual. Busses can be routed to Output objects (Master Faders) or to other busses.

Audio Output Object

This is Logic's Master Output object, equivalent to the master output faders on a mixing desk. If you have audio hardware which features multiple outputs, you can set up an Audio Output object for each physical output—or output pair (Out 1 and 2, Out 3 and 4 etc.). It also acts as a "group" fader, where multiple audio channels can be routed to it, and volume or pan can be adjusted globally for all "grouped" channels. This fader type features a *Bnce* button which is used to bounce (digitally combine, or mix) any incoming audio—from the other fader types—to a mono, stereo or multiple Surround-format audio files.

Audio Instrument Object

This is a unique audio object in Logic. It supports the use of software-based "instrument" plug-ins. These "plug-ins" include Emagic's ES1 and ES2 Synthesizers, EXS24 Sampler, EVP88 E-Piano, EVD6 Clavinet and EVB3 Organ plus third-party Audio Units instruments. Although the Audio Instrument object looks similar to Logic's other audio objects, it supports MIDI *note* input, which the others do not. This enables appropriate plug-ins placed in the *Input* "slot" (*I/O* section) of Audio Instrument channels to be "played", just like an external MIDI synth, sampler or module.

Master Volume

This, as the name suggests, is a Master Volume control for the entire mixer. It is Logic's equivalent to the Control Room fader on a mixing desk.

Auxilliary Object

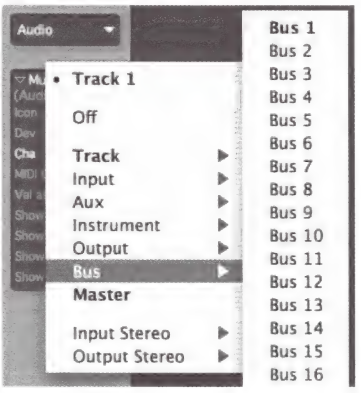
The Auxiliary object is, as the name suggests, used as an "extra" or "supporting" channel for other objects. Its use is generally for more sophisticated mixing options, so for now, we suggest that you concentrate on the more "basic" audio object types—i. e. Audio (Track), Bus and Output objects.

The diagram shows—from left to right—the Audio Track, Audio Input, Audio Instrument, Bus and Output faders. Please note the "Cha" entry in the parameters box for the selected "Audio 1" Track fader. Another point to note are the surround pan controls on three of the first four faders. Each can be set to a different Surround format. Logic can use any of 12 Surround formats simultaneously, on a per-channel or per-bus basis. Additionally, note the Touch, Read, Latch, Write and MIDI text windows on each fader.

Each audio object, regardless of *type*, is manually created in the following way. Obviously, much of this was/can be automatically taken care of by the *Logic Setup Assistant*, but if you want to know how ... here's the method.

- Open the Environment via the Windows menu or Key Command

- Select the "Audio" Layer from the Layers menu.
- Create an Audio Object by selecting New > Audio Object. This will generate a small "waveform" icon onscreen.
- Double-click on the icon to change its appearance to an audio fader, as shown in the image above.
- Clicking on the *Cha* entry in the Audio object's parameters box will allow you to select the audio object *type* via a hierarchical menu, as shown in the following diagram.



- It is very important that no two audio objects are assigned to the same *Track, Instrument* etc.—i.e. do not create two audio objects that are assigned to Track 1, or Instrument 3, for example

Important!

- The *MIDI channel* entry determines the channel used by the Audio Object. By default, this will match the Audio Object's Track number—i.e. Track 1 will be set to MIDI channel 1, Track two to channel 2 a.s.o. Again, ensure that no two objects of the same *type* are assigned to the same MIDI channel. There is no need to concern yourself too much with this parameter. It is of little consequence to Logic's Track Automation system, and is primarily of use for compatibility with songs created in older Logic versions.

Tip

You should only set up as many Audio objects as you think you will reasonably need. In other words, don't set up 64 audio playback channels if you are only likely to use 16 tracks of audio playback in your normal "day to day" use of Logic. The reasons for this:

- Each channel (audio object) occupies an amount of onscreen space, and when dealing with an Environment that has, say 40 audio playback objects, you will find yourself scrolling endlessly through faders when using the Environment's audio mixer (Audio > Audio Mixer).
- Each audio object uses system resources, even when not in use.

Similarly, you should only set up as many Bus, Audio Instrument and Audio Input objects as you think you will need (and your hardware, and Logic version allows).

The *Logic Setup Assistant* will create an adjustable number of audio objects of the following classes when Logic is first run: You may freely adjust the default values in the appropriate page of the LSA. Please keep in mind the concept of only creating as many of each object class (type) as you realistically need in your "normal" use of Logic.

- Audio Playback Channels (Audio Tracks)
- Audio Instrument objects
- Bus Objects (Returns)
- As many Master Output objects as your hardware supports. These are generally displayed as *stereo* objects for each stereo output pair—i.e. an object for 1 and 2, another for 3 and 4 a.s.o.
- A Master Volume fader

The maximum number of Audio Objects in each class depends on your version of Logic.

If you find that you need, or would prefer, more (or fewer) of a particular type of audio object as you work with Logic, you can return to the Environment and simply create (or delete) them, as per the steps outlined. Note that the maximum number of each audio object type which can be created, is primarily determined by the version of Logic you are using. As an example, Logic Platinum allows up to 16 busses, Logic Gold up to 8, and Logic Audio 4.

2.7 Setting Up Tracks

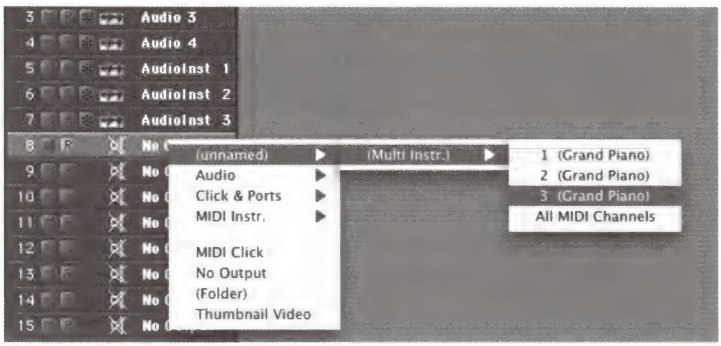
At this stage, you should have a functional Environment that allows MIDI and Audio input and output. Congratulations!

There is one final step, which we strongly recommend, to complete the customization of your default song.

Save your song, if you haven't already done so, as "Autoload" *in the Logic program folder*. This is done via the File > Save As ... menu. In the ensuing dialog, browse to the appropriate folder, if necessary, and type "Autoload", then press ↵.

Important!

Open the Arrange window via the Windows menu or Key Command.



As you can see in the image, the hierarchical flip menu can be used to replace the "No Output" entries with any Audio or MIDI object created in the Environment. This works in the same fashion for all tracks in the Track List.

Create a number of Audio tracks, MIDI instrument tracks and Audio Instrument tracks to suit you. It is unnecessary to create a track for every channel of your MIDI synths, or for every audio channel—but one or two channels for each synth, a couple of audio instruments and four audio tracks should be fine to start with. Delete any unused tracks by clicking on any "No Output" track and pressing the ⌫ key. As you do this, the next track in the list—working from top to bottom—will automatically be selected.

Tip

Once done, save your "Autoload" song via File > Save. Whenever you launch Logic, or create a new song, this Autoload file will automatically be opened—with audio tracks, MIDI tracks and Audio Instrument tracks prepared—and ready for immediate use.

Important!

Alternately, you may wish to make use of the Project Manager—working in "Projects", rather than song files. That said, the song file is still contained in the overall project, but this is something that you can explore further in the Reference Manual.

There are many further customizations that can be made to the Autoload song, both in the Environment and elsewhere in the program, as preferences. We'll introduce you to these as we continue working through the Introduction Manual. You can always make changes—which can be saved in your Autoload—as you become more familiar with how you prefer using Logic.

Information on further Environment customizations you can make to your Autoload are found in the *Miscellaneous Info* chapter, from page 161.

3 Using Logic

This chapter covers the basics of many of Logic's functions by using "hands-on" examples. You will learn how to arrange a song, record a MIDI sequence, record and insert audio regions, plus a number of other techniques. You will also be introduced to a number of preferences which affect the way Logic operates—globally or within specific parts of the program. These preferences can be applied to your Autoload song, if desired. After working through this chapter, feel free to return to your Autoload and adjust the preferences to your liking. Use of Logic's extensive audio mixing facilities are covered in the following chapter.

Please ensure that Logic is open and that you read through things in order. This is the time to experiment, as this will familiarize you with the functions, general working methods and interactions between the different parts of the program.

Please use the appropriate Key Command—marked as shown—whenever possible. Try to develop this "good habit" from the start by using Key Commands throughout the Tutorial chapter.

As you're working through each section, take as much time as you need. Repeat any exercises, if necessary, until you feel comfortable with the techniques discussed. This is *your* studio, so there's no need to watch the clock. Oh … and don't forget to have fun!

In order to follow the tutorial you should have:

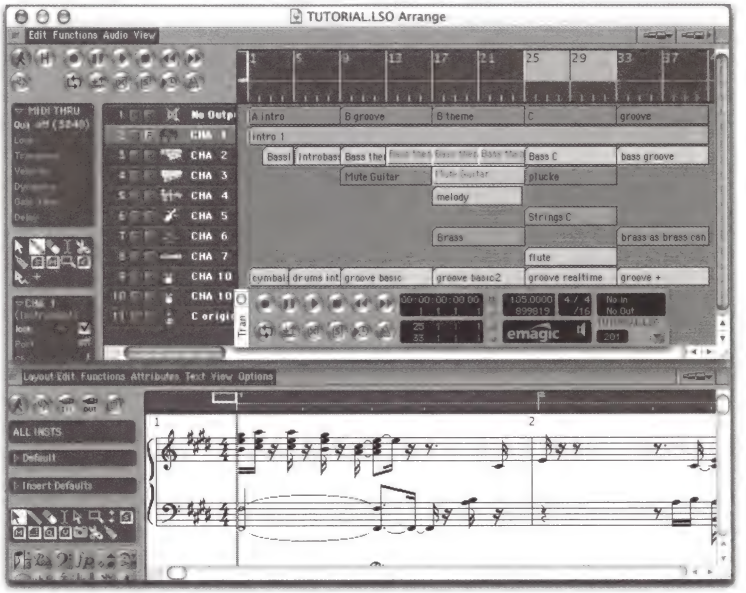
- installed Logic
- a General MIDI tone generator or an equivalent multi-timbral device, which is correctly connected to your computer's MIDI interface.

3.1 Adapting the MIDI Tutorial Song

As you work through this chapter, use the provided Tutorial song. This song is configured for General MIDI (GM) tone generators, but you won't have any problems using the song with tone generators that don't follow the GM specification. The only difference when using a non-GM device, is that you will manually need to set the sounds and MIDI channels the first time you run the song. You may also need to transpose some tracks. If any of these steps are necessary, be sure to save your changes, so that you don't need to repeat the procedure every time you reload the song—which we will ask you to do several times during this chapter.

Load the MIDI Tutorial Song

First copy the "MIDI Tutorial " song file to your hard drive. The "MIDI Tutorial" song file is located on the "Emagic Demo Songs CD" inside the "Logic Tutorial" folder. You can start the Tutorial song by starting Logic, selecting File > Open, and browsing to the "MIDI Tutorial" song file on your hard drive or by double-clicking the "MIDI Tutorial" song icon.



Arrange window with the Tutorial song loaded.

3.1.1 General MIDI Tone Generator

The program change, volume, and pan settings for this song are customized for GM tone generators, and are sent to your device via MIDI. The transmission of these settings happens automatically, if you play the song from the beginning. You will find the settings in a separate sequence—"GM Setup"—at the start of the song. As delays can occur with some synthesizers when they receive program change data, you should mute this sequence after it has been played through *once*.

To mute the program changes:

- Select the mute tool from the toolbox, and use it to click on the sequence named "GM Set-Up".

The sequence will turn black, to indicate that it is selected, and a bullet will appear in front of the sequence name. This bullet indicates that the sequence is muted.

Tip

You may also wish to activate the *Muted Objects are textured* parameter in the Logic Menu > Preferences > Display Preferences, to further highlight muted objects.

3.1.2 Non GM, Multi-Timbral Tone Generators

If you do not have a GM tone generator, you need to consider the following points:

One prerequisite for GM compatibility is that the sounds listed in the following table are available. If necessary, find similar sounds in your own device.

In addition, the drum kit's note assignment needs to match that of the GM drum map (previously Roland drum map), otherwise the percussion passages in the tutorial will be reproduced with the wrong drum sounds. Set the appropriate receive channels in your multi-timbral synthesizer, and assign sounds similar to those listed in the tables. If you need to rearrange your Drum kit's note assignments, follow the percussion instrument table in the *Drum Kit* section.

3.1.3 Sounds and MIDI Channels

MIDI Ch.	*Function*	*Sound*	*Possible Name*	*Vol*	*Pan*
1	chord	combination piano/E piano	Electric Grand, LA Grand	110	0
2	bass	normal E bass	Pick Bass, Rock Bass, E Bass	127	0
3	accents	muted E guitar	Mute Guitar, Slap Guitar	127	R
4	melody	long dying away melodic sound	Synthbell	100	0
5	carpet	string section	Slow Strings, Pad	90	0
6	accents	wind section	Brass Section	80	L
7	solo	flute-like solo sound	Stream, div. "Solo"	120	0
10	drums	GM-compatible drum set	GM Kit	110	0

3.1.4 Drum Kit

Here is a list of percussion instruments used by the Tutorial song, and their locations. (C3 = Note number #60)

Note	*Instrument*
C1	Kick
D1	Snare (normal)
E1	Snare (hi)
F1	Tom lo
F#1	HHT closed
G1	Tom mid
G#1	HHT closed short
A1	Tom hi
A#1	HHT open
C#2	Crash
D#2	Ride
E2	Ride Bell

Tip

Transposition and relative volume values are only automatically correct with GM devices, so you should play the song a couple of times to see how it sounds after assigning compatible sounds.

Open the Track Mixer via the Windows > Track Mixer menu or ⌘2 Key Command and use the faders to adjust the MIDI volume levels, if necessary. For further information on the Track Mixer, see the *Track Mixer with Audio Channels* section, from page 114 onwards.

Once you are happy with the sound selection, transposition and level settings, save the song file via File > Save.

3.1.5 Starting the Song

- To listen to the Tutorial Song, simply press enter (or ⌧ on german keyboards) on the numeric keypad of your computer keyboard.

- To stop the song, press = on the numeric keypad; on Powerbooks, use the Return key (↵)

- To return to the beginning of the song, push the "Stop" key again (= or ↵).
- Alternatively, you can use ␣ (Space) to toggle between Start and Stop.

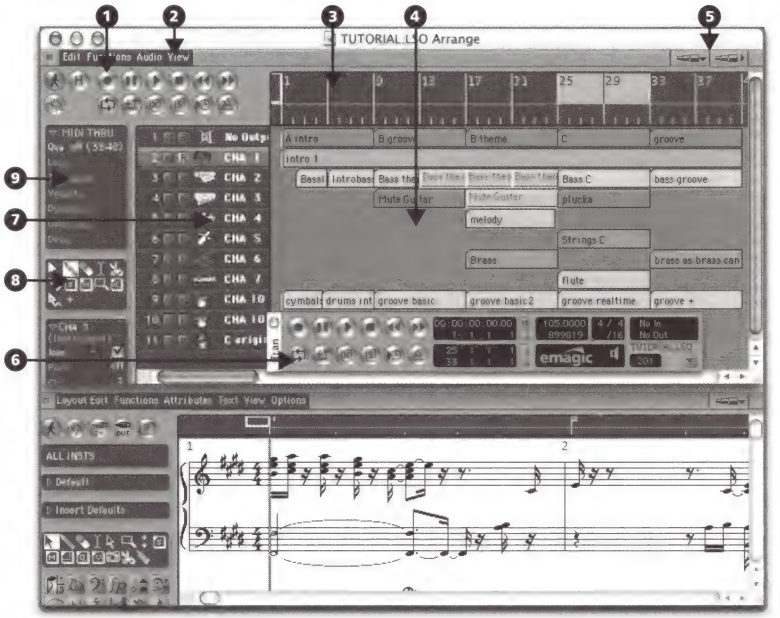
These "Key Commands" for the Transport Bar are much faster to use than clicking on the buttons with the mouse.

Throughout the tutorial, we will indicate the appropriate Key Command for various functions. Please use them as you work through this section. It will help you to memorize them, and by the end of the tutorial, you probably won't even think about "which key?"... you'll innately know them.

Give the song a listen now, and press stop—using = (or Return)—once you're done.

3.2 Overview

Within the Tutorial song, you will see the following onscreen:



1 Transport field This is where you control the operation of Logic. You can turn on Cycle, set drop in/out points for recording, adjust synchronization settings, and many other options.

2 Main menu bar This is where you will find global functions, e. g. for saving and loading songs or for opening various windows.

3 Bar/Beat Ruler The Bar Ruler displays Logic's time axis. Here, you can set markers with the mouse, or jump to any desired place in a song.

4 Arrange area, with sequences A track may contain any number of sequences. Sequences contain the actual data, such as notes, controller data, etc. The data can be edited in a variety of ways.

5 Telescopes If you click on the telescopes, you can alter the magnification factor of the window's contents and adapt them to your screen resolution.

6 Transport window The transport window performs the same functions as the transport field, but can be located anywhere onscreen and is variable in size. A "slider" enables quick jumps to any song position.

7 Track List column Here, you can determine the MIDI channel for each track, swap, insert or delete tracks.

8 Toolbox Using tools from this box enable you to edit sequences, notes or other data in a variety of ways.

9 Sequence parameter box The sequence parameter box is where quantization, transposition and other aspects of the playback for a sequence can be non-destructively edited.

As you can see, the Arrange window is divided into three basic "areas"—from left to right, these are; the Parameters, the Track List and the Arrange area. Above the Arrange area, you'll find the Bar/Beat Ruler, sometimes referred to as the Time Line.

While reading the information in this section, you'll learn how these various areas interact with each other and will also discover how similar the handling of both MIDI sequences and audio regions is in Logic.

3.3 Tracks and Sequences

Like a multitrack tape machine, Logic works on the basis of "tracks". You can see and access these tracks in the Arrange window's Track List—shown below.

Narrow rectangles known as "sequences" appear in the *Arrange Area*—horizontally aligned with the tracks listed in the Track List. A sequence represents an individual recording, or "take" of MIDI data. Each time you record, a sequence will be created on the selected track. You can consider the sequence a "container" for the actual MIDI data. This data can include—either individually or in combination—note events, control data, program changes, or even sysex data for your MIDI tone generators. To explain;

- Note data is derived from the notes played on your MIDI keyboard. It includes information about the time (bar/beat position) the note was played, how long the note was held and the velocity at which (how fast) the key was struck.
- Control data (continuous controllers) includes volume and pan position settings and changes, plus any other controllers that you may use, and that your synthesizer responds to.
- Program changes allow you to select different sounds (or "patches") from your MIDI synthesizer or soundcard.
- Sysex (short for system exclusive) is a part of the MIDI language which can be used to store the entire memory of your MIDI devices, amongst other things.

Tracks with sequences

3.3.1 Information Track and Instruments

Take a closer look at the Tutorial song's "information track".

On track 1, you can see the "A intro", "B groove", and subsequent sequence objects. "No Output" is displayed in the track column of track 1. This is a "dummy track", which is not routed to a MIDI output port. The sequences on this track do not contain any MIDI notes or other information. They are simply used as reference markers for the various song parts. As you continue to work through the chapter, you will be using this "information track" as a reference.

Instruments for the Tutorial song are found on the remainder of the tracks: piano on track 2, bass on track 3, guitar on track 4, and so forth. The MIDI channel used by each track is visible in the track parameters box. This information will update as tracks are individually selected in the Track List. In addition, an icon can be displayed for each track. This visually indicates the type of instrument in use and can be freely changed.

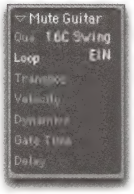
3.4 The Arrange Window

As mentioned, the Arrange window is divided into three areas. This section of the Getting Started will give you an overview of the Arrange window's *interface*.

3.4.1 Parameters Area

There are three "boxes" in the parameters area. They are, from top to bottom, the MIDI Sequence/Audio Region parameters, the Tool Box and the Track/Instrument parameters. You'll also see the Arrange Channel Strip—a Mixer fader for the selected track.

Sequence/Audio Region Parameters



This parameter box, also known as the *Object Parameters Box*, is directly related to the MIDI sequences and audio regions which appear as rectangles in the *Arrange Area* to the right of the *Track List*. When either a MIDI sequence or audio region is selected—by clicking *once* on it with the mouse—this parameter box will update to reflect the parameters assigned to that particular sequence/region. Give it a try on several sequences, and pay attention to the changes which occur in the *Object Parameters Box*.

Each "object" in the *Arrange Area* may have its own parameter settings, allowing independent transposition, quantization and more. The parameters available for MIDI sequences and audio regions are different. The reasons for these parameter differences are due to the very nature of MIDI and audio, which we discussed in the first chapter of the Introduction Manual.

To change a parameter value, simply click-hold to the extreme right of the parameters box—alongside the parameter entry. This will open a flip menu for some parameters, and for others will change the cursor to act as a slider. For these parameters, drag the mouse on the vertical axis (up and down) to change the value. Please select a sequence, and give this a try for each of the parameters to familiarize yourself with the methods used to interact with each of them.

Some Extra Tips for the Object Parameters Tip

- In the Object Parameters box, the transpose, dynamics, gate time & delay functions have a couple of "zones" to the right of the text where you can click with your mouse. If you click to the extreme right of the box, you will be able to increment/decrement values in individual steps. If you click the mouse in about a half centimeter from the right hand edge of the parameter box *Delay*, a flip menu of mathematical variables will show up—*1/8th*, *1/16th* a. s. o.—allowing you to select one, if appropriate to the task at hand. Why not give it a try?

- On a program-wide level. Double-clicking on numerical values in almost all parameter boxes, editors, on the transport bar etc. will allow you to directly type in a value. This method of direct numerical entry can be used for quantize, program changes, many effects parameters etc. which will accelerate your workflow. To do this, double-click on the numerical values within the various parameter fields and use your computer keyboard to type in a new value, followed by the ⏎ key. Once again ... give it a try.

Important!

It should be noted that the Object parameters are available as real-time processes, meaning that changing these parameter values—quantize, transpose etc.—can occur while Logic is running. These processes occur on *playback* and do not actually alter the underlying MIDI data. To undo any changes made to an object's parameters, simply select the appropriate object, and change the parameters back to their former settings using the techniques described above.

The Tool Box

Key to selecting and altering MIDI and audio information in the Arrange Window and Logic's other editing windows, is the Toolbox. This contains a pointer, pencil, eraser, scissors & glue tools plus others which allow you to select, draw, cut, copy, paste, delete, merge and crossfade (audio regions only) sequence and/or audio regions. There is also an automation "draw" tool.

The toolbox is context-sensitive. This means: Its look depends on the edit window. Different tools will appear for particular tasks in the various individual edit windows. As an example, there is no crossfade tool in the Score window as audio is not handled in this editor. There is, however, a voice separation tool in the Score window. The practical use of the tools is discussed throughout this chapter.

In the toolbox, you can select any editing tool required by simply clicking on it with the mouse. You can also select a second tool for use via ⌘ + mouse button on Mac OS.

Tip

When you need to use any of the tools, hit esc on your computer's keyboard and the Toolbox will "float" at the location your mouse pointer currently occupies onscreen. When the floating toolbox appears, simply select the appropriate tool with your mouse cursor. As usual, try it out.

The Track/Instrument Parameters

This set of parameters is linked to the second onscreen area—the Track List—and is used for global parameters such as the selection of instruments (*Prg*—Program Change), the overall track volume, transposition and more for *all* "objects" on the track.

This parameter box will update each time a new track is selected in the Track List.

Please select a few tracks in the Track List with the mouse or by using the up/down arrow keys on your computer keyboard. While doing so, watch the changes in the Track/Instrument parameters box.

The Track/Instrument Mixer Channel

Dependent on the amount of vertical space that is available (i. e. your screen resolution), you will also see the Mixer channel that corresponds to the selected track in this area.

If the lower portion of the channel is obscured, you can click on the small "arrowheads" at the top left of the Sequence/Audio Region and Track/Instrument parameter boxes to collapse one, or both, of these panels. This will allow you view the entire channel strip.

The Arrange Window Channel Strip, as it is known, is identical to the channel strips found in the Track Mixer and Environment windows. Any changes you make, in any of these windows/mixers will instantly be reflected on their counterparts. The advantage of having the channel strip accessible from the Arrange window is that it saves you from visiting another window in order to make a quick adjustment to a sound. It also allows you to insert plug-ins, instruments and change routings directly from the Arrange window, thus saving you time.

The Track List

The second area of the Arrange window is known as the Track List. This is where you can add, delete, select, name and reorganize the tracks/instruments used in your song.

Note the highlighted track in the list. This (or any) MIDI track is automatically "armed" for recording—indicated by the red *R* button—as soon as the track is selected. Any MIDI input received by Logic, when in record mode, will be recorded to this track. This recording will then appear as a sequence in the Arrange area.

The illuminated *M* on track 11—"Grand Piano"—indicates that all objects on the track are muted—i.e. all objects aligned horizontally on this track are silent. The mute button actually stops MIDI data transmission on the track.

The (orange) indicator you see to the left of track 12—"Fingered Bass" is a level/activity meter. Such meters appear on all active tracks and are useful aids for keeping an eye on what tracks contain objects that are *currently playing* and their relative levels.

Recording *audio* tracks is a little different to that of MIDI tracks. Audio tracks must first be "armed", which is achieved by clicking on the *R* button on the desired track (You can also customize the *Record Enable Track* Key Command). Once armed, pressing the *Record* button on the Transport Bar (or the *Record* Key Command, default [*], on Powerbooks [#]) will start recording audio data to the selected track.

N.B.—Before *any* audio can be recorded, you must first set a recording path and file name—i.e. a location on your computer's hard disk and a name for your audio files. We'll take a look at how to do this shortly.

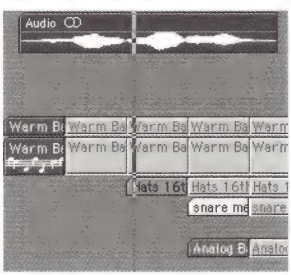
Muting/unmuting of MIDI or audio tracks is achieved by clicking the *M* button on each track in the Track List or by use of the *Mute Track* Key Command ([ctrl][M]) on a *selected* track. Give both a try.

Reorganizing Your Tracks

You may want to reorganize your tracks to keep things neat onscreen, or to group audio tracks or particular instruments together, which can be useful for scoring. To do this, move your mouse pointer over the *number* on the track you wish to move, and click-hold the mouse button. This will change the appearance of the cursor to a "hand" icon as shown.

With the mouse button held down, drag the track up or down the Track List to the desired location, then release the mouse button. This will change your track order, and will also move all of the associated Track objects—sequences or audio regions—in the Arrange area. Please try it out.

The Arrange Area



The third area of the Arrange window's interface is the large gray *Arrange Area*. This is where your audio regions and MIDI sequences are "arranged" into a song. You can freely drag and drop your audio and MIDI "objects" from position to position, make loops, copies and more.

Audio and MIDI data can be recorded directly into the Arrange area as mentioned earlier.

You can add audio regions—in either WAV or AIF format (or SDII format on Mac)—directly to the Arrange area by drag and dropping them from any folder on your hard disk. Another method for adding audio regions to the Arrange window is by pressing ⇧ while clicking at the desired location with the pencil tool. You can also mix your audio and MIDI objects directly in the Arrange area, which we'll discuss in the next chapter.

Above the Arrange area, you'll see the *Bar/Beat Ruler.* This is used for a number of functions performed in the Arrange area, including song navigation. Much of the Bar/Beat ruler's functionality is tied to the Transport Bar, which we'll discuss now.

Reload the original Tutorial Song now, if you have made any changes to the sequence parameters, track order etc.

3.5 Navigating the Song

In this section, you will learn how to move to different parts of the song, start and limit passages, and to isolate and audition specific portions and components within the song—in short, you'll learn how to "navigate" through the song. As you're reading, follow the steps and try out the functions. You can't "break" anything.

3.5.1 The Transport Bar

The second, smaller window, displayed after loading the song is the floating Transport window. It is laid out like the control surface of a tape machine, with the top row of buttons used for operating the *Record, Pause, Play, Stop, Rewind and Fast Forward* functions. In addition, you can use the Transport window to change the tempo settings and engage operations such as *solo*, *synchronization*, or *cycle* which we'll cover shortly.

You can start the song by clicking on the *Play* button on the Transport bar, or by pressing enter on your numeric keypad.

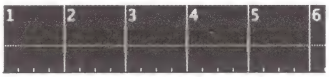
You may hear that the song is not completely arranged, and contains a few inconsistencies. As you continue to work through this chapter, you will finish arranging the song, add a few details, and correct one or two mistakes that we intentionally left in. Following this, the song will be completed with the addition of some audio files.

Try out the buttons in the upper row of the Transport bar. You should be pretty familiar with them as they are identical to the functions found on tape machines and cassette recorders. Each function has a Key Command, as discussed in the first chapter.

3.5.2 Moving to Different Song Positions

There are several ways to "jump" to specific song positions.

At the top of the Arrange window, you can see the Bar Ruler.



- Click at various spots in the lower half of this ruler and you'll immediately "jump" to that position. As you click, a vertical gray line will appear in the Arrange area aligned with the point selected on the Bar Ruler. This is the *Song Position Line* (SPL) which, in the most general sense, is comparable with the tape position indicator on a traditional recording device.
- Engage *Play* via the Transport Bar or by pressing.
- Now click on the Bar Ruler, and hold down the mouse button. Take note of the SPL, which moves to align itself with the mouse position in the Bar Ruler. You can move to any position in the Bar Ruler, and audition different sections of your song instantly, by moving the SPL in this way. *Play must* be engaged for this live "auditioning" (i.e. hearing) to occur.

If you would like to "jump" directly to a specific position when the sequencer is not in play mode (press the *Stop* button now, if Logic is presently running), you can also take advantage of Logic's "locators". To the right of the transport buttons, the current song position—in both absolute time (that's hours, minutes, seconds, in plain language) and as musical measures (bars/beats etc.)—is displayed.

- Click-hold on the song position indicator, and with the mouse button depressed, drag the mouse on the vertical axis (up and down) until the song position displays "17 1 1 1", and start playback—you know the Key Command. Logic will begin playing at measure 17. Take note of the SPL as you're doing so.
- Another way of doing the same thing is to double click on the current song position locator on the Transport bar. This will open a text dialog box, where you can directly type in *17*. Give it a try.

If you need to enter subdivisions, seperate each number by a space or colon, e.g. *17 3 2 1* (don't forget the ⏎), which translates to bar 17, beat 3, sub-beat 2, clock tick 1.

3.5.3 Display Current Song Position

If you manually enter and jump to positions, the song overview displayed can, on occasion, not correspond to what you hear. You can, however, guarantee that these two things always match.

- Click on the *Catch* button found to the upper left of the Arrange window, and the song overview will update, following the song position line again.

This facility ensures that when the song position line exits the visible portion of the song overview, the display will update to follow it. In general, catch mode should be activated while using the program.

3.5.4 Zoom a Window Excerpt

You can view the entire song in the visible portion of the window by using the telescope symbols at the top right.

Click on the left half (narrowly spaced lines) of the telescopes until you can see all of the sequences in the window. There are also Key Commands for zooming, which we discussed in the *Zooming* section, from page 34 onwards.

Give it a try!

3.5.5 Cycle Mode

In cycle mode, you can endlessly repeat a section of the song as long as *Play* is engaged. This is useful for editing sequence parts "live"—i.e. as the song is playing, or for the recording of new tracks to a specific section of the song. Two "locators" can be used for setting *cycle regions*. These are position markers that define the left and right boundaries of a song segment. They are found directly to the right of the *bottom row* of the Transport's control buttons.

To activate Logic's cycle functions:

- Turn on the cycle mode by clicking on the *Cycle* button in the Transport window or by pressing the cycle Key Command. When active, the cycle button will turn green.

In this example, we'll use part "C" in the information track as the basis for setting the cycle region boundaries.

- If necessary, use the horizontal scroll bar (by click-holding and dragging left or right) at the bottom of the Arrange window to scroll the window view, until you can see sequence "C".
- Click on this sequence once, which will turn black, indicating that it is selected.

In the Functions > Object menu, select Set Locators by Objects. This will create cycle region boundaries which match the size and position of sequence "C's" left and right boundaries. Pay particular attention to the display changes that occur in the *Bar Ruler* at the top of the Arrange window:

This visual representation of the cycle region (the highlighted section) can be interacted with directly in the Bar Ruler.

You can adjust it in the following ways:

- Move it by grabbing it in the middle and dragging your mouse to the left or right.
- You can also change the region borders by grabbing either the bottom left or right corners of the highlighted section on the Bar Ruler, and moving the mouse left or right.

Try both and when done, resize to match the region shown. Press *Play* and allow the region to cycle over the selected 8 bar section. You can even resize the cycle region while the cycle is playing, using the technique mentioned above. When cycle mode is engaged, pressing *Stop* twice will move the SPL to the beginning of the cycle region, rather than the beginning of the song, which is its default behavior. Give it a try.

3.5.6 Selection Techniques

In order to edit *any* data type in Logic—be it sequences, audio regions or notes—you first need to select them. All functions and operations will only affect items that are *selected*.

Solo

- To start, turn on the solo function by clicking on the *Solo* button in the Transport window or by pressing S—the *Solo* Key Command. The *Solo* button and the Bar Ruler at the top of the Arrange window will turn yellow.

- Ensure that "Cycle" mode is also enabled, and that the cycle region boundaries extend from bar 25 through 33 (Section "C").

- Start playback, and click once on the "Piano C" sequence to highlight it. As mentioned earlier, highlighted sequences will turn black indicating that they are selected. You will hear the piano part in isolation, because when *Solo* is active, only selected sequences will play.
- Click on the other sequences in section C, one at a time, to "solo" them.
- Once you've got the hang of this, you can go one step further by "soloing" several *selected* sequences.
- Select "Piano C" once more.
- Now, hold the ⇧ key down, and click on the "Bass C" sequence. This will also be selected and played.
- With the ⇧ key still depressed, click on the "Groove Real-time" sequence. You should now hear the piano, bass, and percussion parts.
- While still pressing the ⇧ button, click just below the "Groove Real-time" sequence, and keep the mouse button depressed. Now, drag a "lasso" over *all* of the sequences in section C.
- Your previous selection will now be reversed and you will hear all sequences *except for* piano, bass and percussion.

Try out the selection functions with other sequences, individually and grouped (using the ⇧ key), if you'd like more practice.

And congratulations!
You've just mastered the most essential of Logic's techniques—the selection of objects—sequences, notes, audio regions ... you name it!

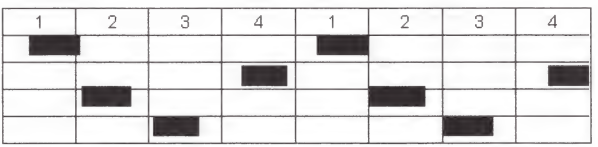
Don't forget that portions of individual audio regions or sequence objects can be selected with the Marquee tool.

3.6 Changing and Creating Sequences

Although we briefly touched on the Object Parameters in the *Parameters Area* section, from page 83 onwards, and the Tools elsewhere, this portion of the Introduction Manual is altogether more in-depth and hands-on. You will learn most of the *practical* information you need to handle sequences in this section, so take your time. Practice each step as many times as you need to.

3.6.1 Quantize

Quantizing is the rhythmic correction of notes, aligned to positions on a "grid". When quantization is applied to any selected event or sequence, Logic will move all note events to align perfectly with the nearest grid positions.



In the image, the first 4 beats show unquantized note events. In the second four beats, the notes have been quantized, and now align to the nearest beat positions on the "grid".

We'll use the "Groove Real-time" sequence as an example. The timing of note data in this sequence was intentionally left slightly off the beat. To correct these small timing errors, you will use Logic's quantization facilities.

To best illustrate how quantization affects MIDI note timing, we strongly recommend that you enable the Metronome.

- To do this, click on the *Metronome* button found towards the lower right of the Transport bar.

By default, Logic transmits the metronome click to Audio Instrument channel 64.

Press *Play* and solo the drum sequence, using the technique you learned earlier. When compared to the metronome click, you will hear that the "groove" is not perfectly on the beat.

- In the *Object Parameters box*, click-hold on the *off (3840)* text alongside the *Qua* entry. In the flip menu which opens, select the *16D Swing* setting, and release the mouse button. This quantize value will then be displayed in the sequence's parameter box. As the sequence continues to play, you'll discover that it now sounds rhythmically perfect.
- Try out the other quantize values on this sequence, in order to hear the effects of Logic's quantizing options. Once you're done, reselect the *16D Swing* setting.

Spend some time looking at the quantize settings used on the various song parts. Remember that selecting each sequence will update the Object Parameters box.

You will notice that the swing factors—Quantize values followed by an alphabetic character—are different for many of the sequences. Judicious use of these "groove" factors can make your choruses sound like they "swing" more than verses do, for example. This is a great thing because your music will sound like it's played by you, rather than your computer, even if the quantize functions are used.

Another thing to consider, while experimenting with different quantize settings, is that this operation happens in real-time, while the sequencer is playing. As you've also discovered, you can jump to different song positions, solo tracks and change cycle regions while Logic is playing. This real-time functionality is available for most Logic operations and allows you to concentrate on your music, not wait for the program to process data, while listening. Keep reading, there are many other real-time features and functions for you to discover which will aid your creative flow.

3.6.2 Loops

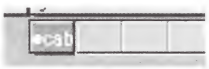
"Loops" are automatic repetitions of a sequence. The loop function enables you to repeat a passage as many times as you wish, without having to copy it.

Let's add a cabasa to the Tutorial song. We'll use it in the "B Theme" and "Groove" sections of the song, as outlined in the information track.

A sequence named "cabasa" can be found on track 10 at the beginning of bar 17. You will notice that it is muted. Muted sequences are identified by an bullet which precedes the sequence name, and are also paler in color than non-muted sequences.

- Click on the sequence *once* with the mute tool, which will unmute, and select it.
- Click once with the mouse alongside the *Loop* entry in the Sequence Parameters box. This will then display the word *ON* to indicate that the loop function is active.

You should now see the following displayed onscreen:



The cabasa sequence will now be repeated until the end of the song is reached. In this example, however, we'd like to stop it before then. Loop repetitions are displayed as gray bars that are of the same length as the original sequence.

The way the loop function works is as follows:

A looped sequence is repeated until it encounters another sequence on the same track (or the song ends). To "turn off" the cabasa at a desired position, simply insert an empty sequence onto the cabasa track. For now, we'd like you to do this at the beginning of section C. Here's how...

- Select the *Pencil* tool from the toolbox, and click once in the cabasa track at position 25 1 1 1—i.e. directly on top of the loop repeats. This will insert a new, empty sequence and your screen should now look like this:

The insertion of this blank sequence onto the cabasa track will stop the looped cabasa part at measure 25. Press esc twice.

Copying a Loop

As a final step for you to try with this loop example, we'd like you to copy the cabasa part to the "groove" section of the song.

- While pressing the ⇧ key, click on the cabasa sequence, and—*importantly*—the "stop" sequence you just inserted. When both have been selected, release the ⇧ key.
- Press the ⌥ key. Click on the cabasa sequence, and drag the entire section to measure 33, while keeping the modifier key pressed. The entire passage, including the stop sequence, will be copied, and you're done!

If the "stop" sequence is not copied, the original sequence—with the *Loop* playback parameter active—will be copied to the desired location. This will create a sequence copy with loop repetitions that continue to the song end point, which may not be what you want to happen.

The *Loop* parameter, and the Copy function that you just used are a great way to quickly create drum tracks, bass parts etc. that are repeated throughout your songs. In many musical styles, the use of recurring motifs (the same bassline, drum part, chorus etc.) is commonplace, and you now know this technique which may help you to arrange your future songs more quickly and easily.

3.6.3 Resizing a Sequence

Each sequence (or audio region) can be resized by clicking on its bottom left or right hand corner and dragging to the left or right.

With audio regions, dragging from the bottom left hand corner to the right will also move the anchor point, which we'll discuss later in the chapter. Dragging from the right hand corner to the left will shorten the audio region. No audio region can be longer than the underlying audio file on which it is based.

The reason why you would want to resize any sequence or audio region may be to create a drum "fill", or simply a variation on an existing sequence (or copy). Perhaps a section of a solo?

- Using the looped cabasa section—*not* its loop repetitions—you just created, click and hold on the bottom right-hand corner and adjust its size by dragging the mouse left or right.
- As you can see, the cabasa sequence and all of its loop repetitions have changed length. Now play the sequence (and loop repetitions) to hear the differences.
- This is a real time function, so why not set up a cycle region over this section and resize a few other sequences to see how using a portion of some parts, and lengthening others, can completely change your arrangement?

This functionality, combined with the looping and copying functions is a great creative tool that can help with quick song construction.

While experimenting, ensure that any changes you make to your sequence lengths are returned to their original state.

3.6.4 Moving a Sequence

Using the mouse *Arrow*—the "default" tool—you can move sequences onto other tracks, or to other positions within the Arrange window.

To illustrate this, we'll insert a "B" part in front of the groove section of the Tutorial song. From there, we'll transpose this newly created B section by a semitone. Before beginning, however, we need to create some room in the arrangement to accommodate this new section. Here's how:

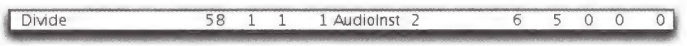
- Press the mouse button and rubber-band select all of the groove section sequences.
- Once all are highlighted, grab and drag them eight measures (bars) to the right.

- Use the position display on the Info Line as a reference point. It should read "41 1 1 1" when you release the mouse button.

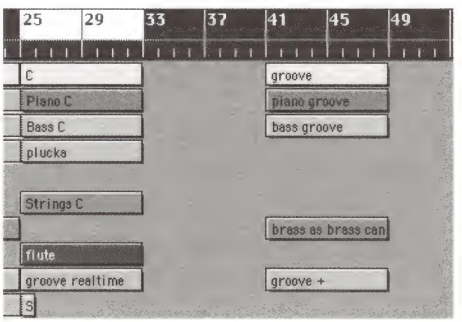
Tip

As part of your general working method, you should *always* refer to the Info Line when carrying out any of the following operations in Logic: move, copy or cut/divide. This will help you when editing and arranging, and can aid in avoiding disastrous mistakes. See the Undo section below.

- The Info Line appears at the top of the active edit window, whenever you are performing an edit.



Once you're done, the Arrange area should look like this:



3.6.5 Undo/Redo

Did you make a mistake, like not selecting all of the sequences, or perhaps you moved them to the wrong place?

If so, this is a good time to become acquainted with one of the most important functions in Logic—the "Undo". With the *Undo* function, you can always undo any previous *editing* step, should things go wrong.

- To use the *Undo* function, select Edit > Undo "edit function name". In this example, the sequences will be reset to their original positions and you can now re-attempt your edit. Give it a try, even if you got the edit right.

- To reverse the *Undo*, select Edit > Undo a second time.

- You will also see an Edit > Undo History menu option. Click on this, and you will see a listing of all of your previous editing actions. You can "go back in time" to any of these edit operations. Click on one to see what happens.
- To return to the most recent editing step, click on the most recent entry—i.e. the one at the bottom of the list. Cool huh?

Important!

It's important that you make the distinction between what can be undone and what can't. As an example of this—the quantize or transpose playback parameters do not actually alter data. They simply change the way it is *played back*.

Real-time playback parameters such as these do not involve an *edit* operation, and therefore the *Undo* function (and thus the Undo History) has no effect on them. As covered earlier, to undo a playback parameter, simply select the affected sequence, and adjust/reset the appropriate parameter to its former (or default) value.

3.6.6 Copying Sequences

Following the repositioning of the "groove" section and the creation of the blank measures between bars 33 and 41, it's time to insert our "B" part.

- Rather than recording an entirely new section (don't worry we'll get to that shortly), you will now copy the "B groove" section to the empty area created when we moved the "groove" section.
- Rubber-band select the sequences of the "B groove" section and release the mouse button.
- Press and hold ⌥ and click-hold on *any* of the selected sequences and move the mouse to the right. A copy of all selected sequences is now dragged with the mouse pointer. (As you're dragging, you will see a "ghost" outline appear)
- Drag these sequence copies to measure "33 1 1 1" (keep an eye on the Info Line) and release the mouse button, where they will fill the space left when you moved the "groove" section. These newly created sequences will have the names of the originals, with the text "*copied" appended to the end of the name.

Tip

You can decide whether or not this extension should appear in the sequence's name by opening the Logic Menu > Preferences > Global Preferences dialog. Click in the checkbox to the left of the Add Last Edit Function to Sequence Name option if you want a description of any edit operations to appear on edited sequences. If not, uncheck the box.

Cutting Sequences

Now, let's cut the sequences in the section just copied in half, using the *Scissors* tool. Following this, we'll take a look at the *Transpose* function.

- Rubber-band select the sequences that were just copied.
- Select the Scissors tool by clicking the scissors symbol in the toolbox. This will change the appearance of the mouse pointer to that of a pair of scissors.
- Click on one of the selected sequences, while holding the mouse button down, and move the mouse left or right. While doing so, constantly refer to the information line.
- When position "37 1 1 1" is reached, release the mouse button. This will cut the selected sequences at the beginning of bar 37.

3.6.7 Transposing Sequences

Reselect the *Arrow* tool, and rubber-band select the sequences between measures 37 and 41. We will now transpose this half of the newly created "B" section, while leaving the first half in the original key. Transposition is the changing of the pitch of a MIDI event or sequence by a number of semitones.

There are two semitones to every tone. There are twelve notes in the Chromatic scale, which use the letters A, B, C, D, E, F and G. The other five notes of the Chromatic scale (A#/Bb, C#/Db, D#/Eb, F#/Gb and G#/Ab) are named by placing a sharp (#) symbol after a note letter to make it one semitone higher, or by placing a flat (b) symbol after a note letter to make it one semitone lower. Transposition makes the selected note/sequence play back higher (sharp) or lower (flat) in the Chromatic scale.

Take a look at the *Transpose* parameter in the Sequence Parameter box. It contains an asterisk (*). This means that the selected sequences each have different transposition values. A nice feature of Logic is that global adjustments made to multiple sequences work relatively. In other words, this means that individual transposition differences (the relative pitches) between sequences are maintained, even if all sequences are transposed.

Let's get on with the job.

- Click on the asterisk that appears alongside the *Transpose* parameter in the Sequence Parameters Box, and with mouse button depressed, move the mouse upwards until the value *+ 1* is displayed.
- Release the mouse button. The passage has now been transposed up a semitone. A value of *+2* would transpose by a tone.

Move the song position line to measure 37, press play, and listen to the result.

You'll hear that this transposed section doesn't sound particularly good, and that some fine-tuning is required. Here's what went wrong.

The percussion part will sound somewhat strange. This is because you unknowingly transposed the percussion sequences, causing the drum note placement to shift. You will need to undo the transposition for the percussion tracks. To do so, select the drum sequences, and drag the *+1* transpose setting down, until the line is empty. This indicates no transposition.

Another problem is that the bass in the copied, and cut B-section, which we have transposed (between bars 37 and 41) is a loop repeat, not a "real" sequence copy.

Loop repeats are merely pointers to the original sequence and can *not* be transposed. Only a "real" sequence or a copy may be transposed. In order to transpose the bass part, you will need to change the loop repeat into a real sequence.

Important!

- Select the "Bass theme*copied" sequence in this section.
- Choose Functions > Turn Loops to Real Copies. A new sequence will now replace the gray loop repeat.

- *Transpose* this up one semitone, from *–12* to *–11* and your transposed section, between bars 37 and 41, will now be perfect.

3.6.8 Your First Recording

The final MIDI exercise in the Arrange window is to make your first recording. Rather than starting a new song from scratch, you can play a solo over the C-section. A flute solo is already in this section, but it could almost certainly be replaced by a better one.

As you're new to using Logic, you may not play the solo perfectly on your first attempt. To aid you in this regard, plus introduce you to a nice Logic feature, we'll set things up so that you can record several "takes" automatically. Once you've finished recording, you can then select your favorite version of the solo.

- Step One: Delete the existing solo. Select the *Eraser* from the toolbox and click on the "flute" sequence, or select the sequence with the *Arrow* tool and press ⟵. It will be deleted.

Now set the cycle and record parameters. You'll probably want a bit of a lead in, before the solo starts, to ready yourself for playing. We therefore suggest that you extend the cycle region's start point (remember the left corner drag discussed in the *Cycle Mode* section, from page 90 onwards) to be longer than the actual recording—i. e. from *23 1 1 1* to *33 1 1 1*. This will give you two extra measures before section C commences at measure 25.

We're sure that you don't want to manually start and stop recording with every cycle region repeat and, thankfully, you don't need to. Logic offers the "Autodrop" function which engages and disengages *Record* automatically at predefined points (this is often called "Punch In/Out"). To do so:

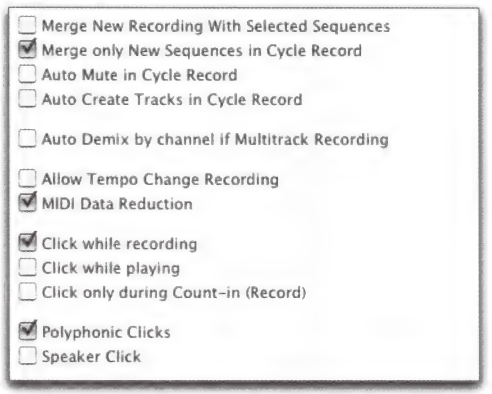
- Click on the *Autodrop* button in the Transport window, just to the right of the *Cycle* button—or use the Key Command. On doing so, the *Bar Ruler* will divide into two sections. The Autodrop bar appears just below the cycle region. Adjustment to the left and right ends is as per the cycle region.

- Set this to span bars 25 through 33, as shown above.

3.6.9 Song Settings

For the next step, a few settings need to be changed.

- Open the File > Song Settings > Recording Options window.
- Check the *Auto Mute in Cycle Record* box.


Merge New Recording With Selected Sequences
Merge only New Sequences in Cycle Record
Auto Mute in Cycle Record
Auto Create Tracks in Cycle Record
Auto Demix by channel if Multitrack Recording
Allow Tempo Change Recording
MIDI Data Reduction
Click while recording
Click while playing
Click only during Count-in (Record)
Polyphonic Clicks
Speaker Click

Selecting this setting causes each previous take to be automatically muted when the cycle repeats. This way, you can record one passage after another, without being distracted by (i.e. hearing) your previous takes. If you would like to hear the metronome while recording, you should enable *MIDI Click* now. The metronome is sent on channel 10—the drum channel—of the first available MIDI port. Confirm the changes to the *Auto Mute in Cycle Record* option by clicking the *OK* button or ↵.

3.6.10 Let's Record!

- Select track 8 on the Track List—the one with the small flute icon—by clicking on it. Simply selecting the track will "arm" it for recording.
- You can now play the flute sound from your MIDI keyboard.
- You can also select other tracks to try them out—Logic automatically addresses the right instrument (*MIDITHRU*). Finally, switch back to track 8.

To have a few practice runs, you can simply start playing the cycle and do a little experimenting on the keyboard while listening.

Tip

If you find soloing in E major is difficult, you can *Transpose* the *MIDITHRU* four semitones down (*–4*) to C major. If you're unfamiliar with musical keys like "C major", transposing the *MIDITHRU* as suggested will allow you to play any of the white notes on your keyboard, and this should sound OK … i.e. "in key".

MIDITHRU always appears in place of a sequence name in the Sequence Parameters Box, when no sequence (i.e. anywhere on the gray background) is selected in the Arrange window.

Any changes made to the settings of the *MIDITHRU*, in the Sequence Parameters box, will be applied to any subsequently recorded sequences.

- When you're confident enough to record the solo, begin recording by clicking [*] on the numeric keypad, or by pressing the *Record* button on the Transport bar. As usual, we recommend the use of the Key Command.

The count-in of two measures will play through, and the cycle region will begin to play repeatedly. You can play over the first two measures of the cycle region, until Logic reaches the left Autodrop point (measure 25) in the song. Anything you play from measure 25 onwards will be recorded. At measure 33, recording will automatically stop, and a sequence will be created on the selected track.

- Allow Logic to continue running. After reaching the right cycle region boundary (measure 33), the SPL will jump back to the left cycle region boundary (measure 23). At measure 25, the next recording will begin.

Allow the section to repeat, recording on each pass, until you feel that you have one or two good "takes". Logic will create a new track automatically, for every cycle repeat, and will move previously recorded tracks down the list.

- Using the *Mute* tool, you can now audition the individual takes.
- Once you've decided on a take, simply delete the unwanted takes by clicking on the corresponding tracks in the track column. Once selected, use the Functions > Track > Delete Track menu function repeatedly, until all unwanted tracks are removed.
- If you accidentally delete the good take, don't forget the Undo function.

3.6.11 Saving the Song

Here's how to save the Tutorial song, with your new solo:

- Choose File > Save As …, and enter a new name—i.e. NOT "tutorial"—for the song to be "saved as" in the ensuing file dialog.

Reload the original Tutorial song for these additional exercises.

3.7 MIDI Event Editing

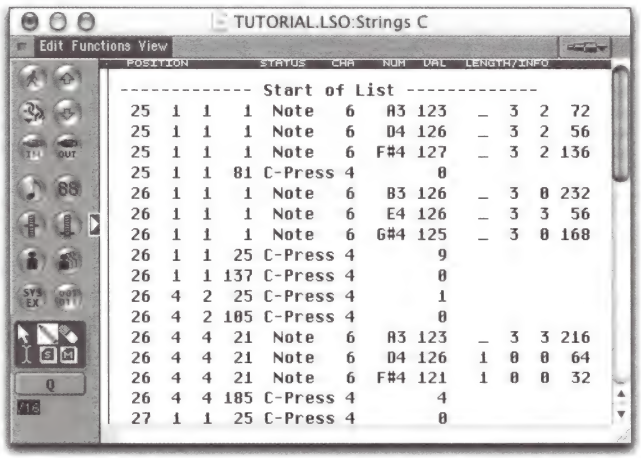
This section briefly discusses the use of Logic's various MIDI editing windows.

3.7.1 The Event List Editor

This editor shows all data contained within a selected sequence as an alphanumerical (a collection of numbers and letters) listing.

- Open the Event List for the "flute" sequence, via the Windows > Open Event List menu or by pressing E.

You can close the Event List by pressing E again (*Toggle Event Editor*) while the menu command (or the separate *Open Event Editor* Key Command) lets you open multiple Event Lists, if desired.



The *Status* column displays the event type. The "flute" sequence contains both note and other types of events. You can hide/show specific event types by using the *filter buttons* to the left of the list.

Click on each of the buttons, except for the one showing a slider at the bottom of its range, so that they turn dark gray.

The Event List will now only display control change events.

- Click on each button, re-enabling the display of all events. Note that as you do this, events of that type will re-appear in the list.

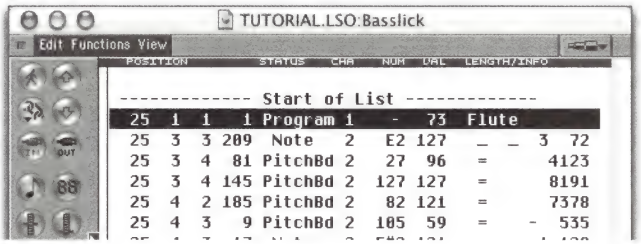
We will now insert two *program change* messages into the solo, changing from a flute sound in the first half, to a synthesizer sound in the second.

A program change message is part of the MIDI language. It tells a synthesizer or soundcard to select a particular sound or "patch"—like a flute or synthesizer sound—from a particular memory location. If you think about it in a different way, this is like telling your computer to select a particular file for copying or editing. Remember that MIDI synthesizers and sound cards are really computers in disguise, so a program change is a lot like a "select this file" now message.

As the solo begins at measure 25, we'll place the first program change for the flute at measure 25.

- Move the song position line to bar 25 1 1 1 in the Arrange window. The SPL is used to determine the insert position for the program change event (message).
- Select the *Pencil* tool from the Event List's toolbox, and click on the program change button shown to the right.

A program change event will be inserted at position 25 1 1 1.


TUTORIAL.LSO:Basslick
Edit Functions View
POSITION STATUS CHA NUM VAL LENGTH/INFO
Start of List
25 1 1 1 Program 1 - 73 Flute
25 3 3 209 Note 2 E2 127 _ _ 3 72
25 3 4 81 PitchBd 2 27 96 = 4123
25 3 4 145 PitchBd 2 127 127 = 8191
25 4 2 185 PitchBd 2 82 121 = 7378
25 4 3 9 PitchBd 2 105 59 = - 535

The program change number is found in the *Val* column. Set this to *73* if you own a GM tone generator. If you are not using a GM tone generator, find a program change number that selects a flute (or flute-like) sound.

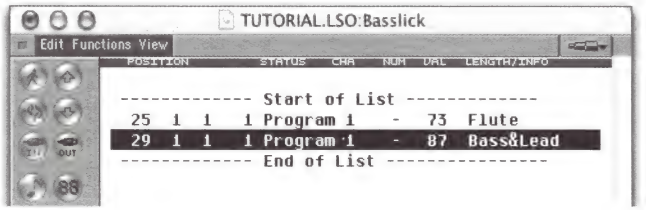
Now, we'll insert a second program change:

- Move the song position line to position *29 1 1 1*, and click on the *Program Change* button.

Choose a *Val* of *87* if using a GM tone generator, or a program change that selects a synthesizer solo sound, with non-GM devices.

- Select the *Arrow* tool from the Event List's toolbox and use the buttons to hide all event types, except program change events.

Your event list should look like the following:


TUTORIAL.LSO:Basslick
Edit Functions View
POSITION STATUS CHA NUM VAL LENGTH/INFO
---------- Start of List ----------
25 1 1 1 Program 1 - 73 Flute
29 1 1 1 Program 1 - 87 Bass&Lead
---------- End of List ----------

Move the SPL to the beginning of the solo sequence (position 25 1 1 1) and press *Play*. You'll hear the solo switch sounds halfway through the sequence.

Congratulations, you've mastered the insertion of program change events. The Event List is very useful for microscopic changes to your sequences. Make sure you read the chapter on it in the Reference manual.

About Program Changes

It should be noted that the Event List procedure outlined above physically writes the program change message to a MIDI sequence object on a track. The advantage of this method is that if a program change message is *written* to a sequence (or several sequences) at the beginning of (or throughout) your song file, then this information will be sent to your MIDI module or soundcard *every* time you load and play the song. This guarantees that the right sounds will be sent every time, even if the song is saved as a MIDI file, and played on another sequencer or SMF-player (Standard MIDI File Player).

As Logic is full of options which allow you to work the way you prefer ... it is also possible to send a program change event by clicking the checkbox beside the *Prg* entry and inserting a number (or scrolling through a list, with the mouse button held down) from the *Track Parameters* box in the Arrange window. You can also do the same from within the Track Mixer window via the top panel in each MIDI fader.

The problem with the latter two methods is that the Program Change message is not *written* anywhere. Even though the settings you make using either method are saved with your song file, there's no guarantee that your MIDI module or soundcard will actually "see" these messages.

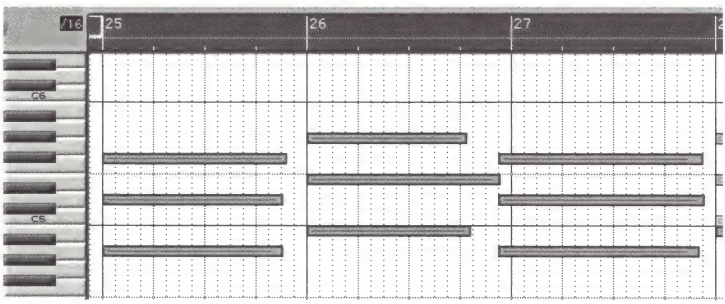
If you find that you've loaded a song and your sounds aren't quite right, you should enable the *Send Used Instr. MIDI Settings after loading* checkbox in the File > Song Settings > MIDI Options, and resave your song. Note that this must be done for all previously created songs.

Tip

If done in your Autoload song, which forms the basis of all of your future work, this will become a default preference. Once done with the Introduction Manual, don't forget to set this in your Autoload song.

3.7.2 The Matrix Editor

Although it looks very different, the Matrix editor is quite similar to the Arrange window. Unlike the Arrange window—note events, rather than sequences—are displayed as horizontal bars in the Matrix editor. Editing, as you'll see, is quite similar.



The "Strings C" sequence displayed in the Matrix window.

- Select the "Strings C" sequence in the Arrange window and open the Matrix window via the Windows > Open Matrix Edit menu.

The keyboard along the left edge of the Matrix window indicates the pitch of the notes/key played in the display. A chord is represented by a group of overlapping bars. You can easily see that the note lengths of the second chord are unequal. In our example, we've included a wrong note in the 4th chord, which we'll get you to fix.

Take a look at this sequence in the Event List as well, by choosing Windows > Open Event List or using the toggle command E.

As you can see, picking up these inconsistencies in the Event List isn't quite as easy as with the Matrix editor. Close the Event List window when you're done.

Tip

When making changes in the Matrix—or any other editor in Logic—you can hear the changes you make in real-time. This is achieved by activating the *MIDI Out* button found towards the top left, in each of the editor windows. We suggest that you activate this button by clicking on it. It will be illuminated when active. The default Key Command ⓞ toggles this button.

Changing Note Lengths in the Matrix Editor

- Highlight all notes in the first chord by rubber-band selecting them.
- Now, grab the lower right corner of one of the selected notes, and drag it to measure 26, so that the end of the bar (i.e. note) connects to the start of the next chord. Release the mouse button.

Any change made to the length of one note, will affect all other selected notes equally in the Matrix editor i.e.—they will retain their relative length differences.

Tip

It is possible to override this relative length difference and force all notes to have the same *end* point by pressing ⇧ while dragging the right corner of selected note events. This method will even work on note events selected across multiple bars.

- Repeat the process, to lengthen each chord so that it meets the beginning of the next. This will create a *legato* effect (where the end of one note meets the beginning of the next) on playback. Increase the zoom level to aid in the editing of the events.

Tip

You can also adjust the *start* point of any selected notes by click-hold and dragging the bottom left corner. Note that the ⇧ function used to align the end of notes does not work on the beginning of notes.

Changing Note Event Pitches in the Matrix Editor

- Select the *Arrow* tool from the Toolbox.
- Select any note event, or group of notes, by rubber-band selecting them.
- Grab the notes in the middle and drag it/them up or down. As you do so, you will hear the pitch change.
- When the desired pitch is reached, release the mouse button.

Deleting Note Events in the Matrix Editor

Now it's time to get rid of that wrong note.

- Select the *Eraser* from the toolbox, and click on the short note at position 28 1 1 1. The note will disappear.

Tip

As an alternative method for deletion of the note—or any other selected event—simply press ⟵.

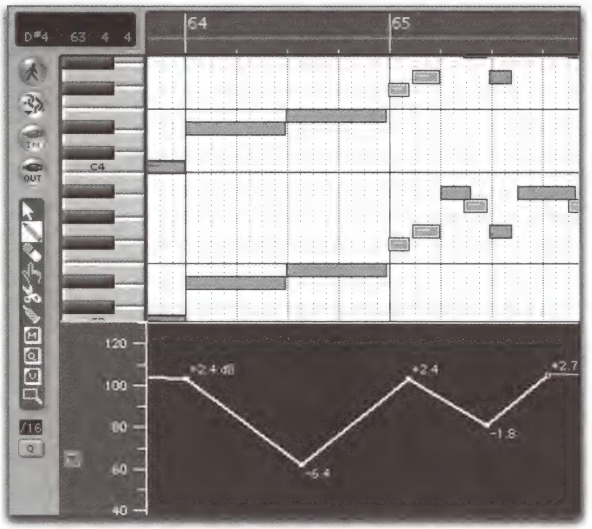
Changing Note Velocities in the Matrix Editor

Velocities (i.e. how fast the note was hit—and usually how loud it is) of notes are indicated by color—with "hot" colors, such as reds used for higher values and "cool" colors, such as blues used for lower velocities. A further indicator of velocities is the line within the note event "bar". Velocities of selected note events can be adjusted with the *Velocity* tool. To do so;

- Select the *Velocity* tool from the toolbox, as shown.
- Click-hold on the top note in any of the chords and drag the mouse up and down. As you do so, you'll note that the color of the selected note event changes and the line within the note changes length. Ensure that the velocity of the selected note is different to that of the other notes in the chord.
- Release the mouse button and—with the *Velocity* tool still selected—rubberband select all notes in a chord. Once all are selected, release the mouse button.
- Click-hold on any of the selected notes and drag the mouse up and down. As you do so, you'll see that the velocity of the note that you edited individually retains its relative distance (level) from the other selected events. As you drag the mouse up and down, you'll discover that when maximum or minimum values are reached for *any* of the selected events, no further increase or decrease in value is possible.

Using HyperDraw in the Matrix Editor

In all versions of Logic, you can make volume and panning changes using the HyperDraw function, within the Matrix and Score editors. The Platinum and Gold versions also allow the "drawing" of controller curves for other types of continuous controllers.



Matrix window with HyperDraw volume curve.

To access the HyperDraw function within the Matrix editor, select View > Hyper-Draw > Volume (or Pan or other controller).

As an alternative method, you can press F8 to activate Hyperdraw. F9 will switch back to the standard Matrix editor view without Hyperdraw.

Tip

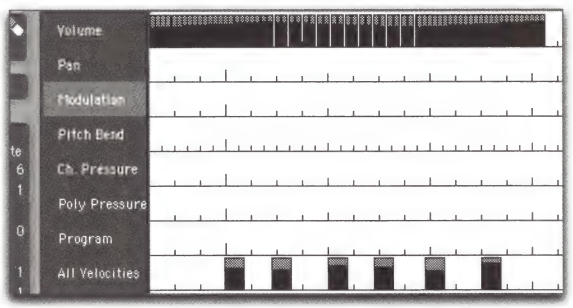
Congratulations, you've now completed the edits for the strings sequence. Nearly all sequences in the Tutorial song contain slight mistakes, which you can easily repair in the Matrix editor. Select one or two of the other sequences and edit them as you did with the String part.

You will probably notice a big difference when optimizing the lengths of notes in the bass sequences.

Tip

3.7.3 The Hyper Editor

This editor is useful as a drum "grid" editor, and also for graphical controller "drawing". When used for drum editing, it is somewhat similar to the use of pattern-based drum machines of yesteryear.



The HyperEdit window

To insert note or controller information:

- Select the *Pencil* tool and click, or click and drag horizontally with your mouse. Higher note velocities/controller values appear as taller vertical bars.

To adjust existing note or controller information:

- Click on an individual event and drag vertically with your mouse (this can be done with the *Pencil* or *Arrow* tools). Alternately, you can "draw" over the existing curve.
- Select the "groove basic" sequence, and open the HyperEdit window via the Windows menu and experiment with these techniques, making use of each of the tools.
- While in the HyperEdit window, click hold on the *MIDI Controls* flip menu and select GM Drum Kit. You'll see a very different view of the "groove basic" drum part. Once again, please experiment with the various tools on the individual parts.

3.7.4 The Transform Window

The Transform window is a very powerful editor that can be customized to build your own preset "transform" operations. It can be used for dramatic MIDI data changes, or for subtle alterations. As an example of the latter, it could be used to reduce the amount of filter modulation from a value ranging between *97* and *105*, by a fixed percentage. While this type of change could be performed in other editors, it would need to be done on each individual modulation event. The Transform window allows you to quickly achieve the same result on multiple events.

To best illustrate how the Transform window can be used, please select the "Piano theme 1" sequence.

- Create a a cycle region from bar 9 to bar 17 using the techniques you learned earlier.
- Solo the "Piano theme 1" sequence
- Open the Transform window via the Windows menu or by pressing ⌘4.
- Select the *Reverse Pitch* preset from the flip menu, to the top left of the Transform window.
- Press the *Play* button on the Transport and listen through a couple of times.
- While the sequence is cycling, press the *Select and Operate* button and listen to the results.
- Use the Undo function to return the sequence to its former state.
- Please experiment with the other presets and buttons, ensuring that you Undo between each process.

3.7.5 The Notation (Score) Editor

A detailed Scoring Tutorial is available in electronic form on your Logic program CD-ROM. This tutorial is accompanied by additional song material, also located on the CD-ROM.

3.8 Audio Tracks and Regions

Logic allows you to digitally record acoustic, electric and electronic instruments or vocal performances into your songs, and to process these audio recordings through Logic's built-in realtime effects. As with MIDI tracks, audio recordings are displayed in the Arrange window on an *Audio Track*.

Important!

These audio recordings are referred to as Audio *regions* in the Arrange window. Audio *regions* are actually visible portions of audio *files*. When you cut or resize an audio region in the Arrange window, the audio file itself is not cut or resized. The "region" that you see is a visual representation of a part of the audio file, and changes that you make to it in the Arrange window simply instruct Logic on *how* to play the audio file. In other words, the audio regions are simply "pointers" to the underlying audio file, and the reason they look like the MIDI sequences (with a waveform display when zoomed) is to make things easy to deal with. After all, you've spent the time learning how to deal with MIDI sequences, so it is reasonable to assume that the handling of audio regions should be similar. As it happens, they are!

It should be noted, however, that although the handling of audio regions and MIDI sequences is *similar* in Logic, it is not exactly the same. As a result, the editing and parameter options available for MIDI and audio tracks is slightly different.

Reload the Tutorial Song for more exercises.

3.8.1 Creating Audio Tracks

We will now create an audio track in the Arrange window, to which a drum loop will be added.

- Select the "Piano" track in the Track List, and create an audio track in the Arrange window via the Functions > Track > Create menu option, or by pressing ⇧⏎. In the Arrange window, a new track will appear below the piano track.
- Click-hold on the "CHA 1" entry in the Track List, and a hierarchical menu will open.
- Browse to Audio > Audio Track > Audio 1, and release the mouse button. This will assign the track to the first Audio channel.

You can rename this audio track by clicking on *Audio 1* in the Track parameters box. It may make more sense to you if you were to name it "Drums", for example. This name will be reflected in the Track Mixer, making it easier to identify when in this window. You can not rename the MIDI tracks associated with Multi-Instruments in the same fashion. Multi-Instrument MIDI track/channel names are defined in the Environment window.

Important!

It should be noted that an audio object must exist within the Environment (on the Audio layer) to allow its selection from the hierarchical flip menu in the Track List. If you require an audio track and no audio objects exist in a Logic song, you need to create them as per the instructions in the Environment chapter. Normally, when working with songs based on your Autoload song, this won't occur, but on occasion, you may download or share song files with other users, and may find that no audio objects exist.

3.8.2 Track Mixer with Audio Channels

Audio and MIDI tracks can be controlled in a number of ways in Logic. The quickest method for level and pan control is via the Arrange Window Channel Mixer (the fader to the left of the Arrange window) or the Track Mixer, accessible via the Windows > Open Track Mixer menu, ⌘2 or by switching to Screenset 2 of the default Song created by the Logic Setup Assistant.

The Track Mixer horizontally reflects the track order as displayed—from top to bottom—in the Arrange window's Track List. The viewing of different object classes can be changed in the Track Mixer window.

The updating of the Track Mixer channels is entirely automatic, so as you add or delete tracks from the Arrange window's Track List, the Track Mixer will show or hide the corresponding MIDI or audio channel faders.

Once the Track Mixer is launched, you should see a new channel named "Audio 1" or "Drums" (dependent on how you named the track).

If you can't see any audio objects, click on the *Global* button, to the top left of the Track Mixer.

The number of the corresponding track in the Arrange window is shown below each "fader", or "channel strip". Four further channel strips (Audio 2, Bus 1 and 2 and Master) appear to the right of the "Audio 1" or "Drums" channel. The two "Bus" channels are used as effects returns. The stereo "Master" fader acts as a master volume control for all audio channels.

- Change the audio channel from mono to stereo operation by clicking the button on the lower left corner of the channel strip. This is necessary, because we are going to import a stereo audio file.
- As a rule, you should use *stereo* tracks when importing (or recording) *stereo* audio files. Obviously, the same applies to *mono* files and *mono* tracks.
- Switch back to the Arrange window by closing the Track Mixer window.

Tip

The Audio layer of the Environment can also be used for audio mixing duties. It can be accessed from the Environment window, or by selecting the Audio > Audio Mixer menu option.

3.8.3 Changing the Track Mixer View

To the left of the Track Mixer window, you will see a collection of buttons, as shown. These buttons will toggle (hide/show) the display of particular classes of channel faders.

Global—Toggles the display between channels which correspond to those that exist in the Arrange window's Track List, and *all* MIDI Instrument and Audio objects which exist in the Environment.

When the *Global* button is inactive (gray) it will display the Arrange window's Track List channels. The other buttons can be clicked individually to display all channels of the selected class which exist in the Arrange window's Track List. Multiple classes can be selected for display in the Track Mixer by holding the ⇧ key while clicking on the individual buttons.

When the *Global* button is active (green) it will display all MIDI Instrument and Audio objects which exist in the Environment. The other buttons can be clicked individually to display all channels of the selected class which exist in the Environment. Multiple classes can be selected for display in the Track Mixer by holding ⇧ while clicking on the individual buttons.

Please try the various Track Mixer display modes with the Tutorial song to get a feel for how this view functionality works.

Important!

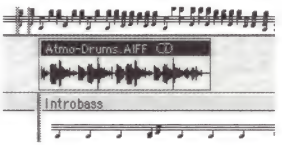
It should be noted that the display of additional classes of channel faders requires that the underlying objects actually exist in the Environment. If they do not, a *This song does not contain this type of object* error message will be displayed. You will need to create these objects as per the instructions in *The Ideal Workspace* chapter, from page 51.

3.8.4 Importing an Audio File

Now, let's import an existing audio recording of a drum loop into the Tutorial song.

- Select the *Pencil* tool, and click at measure 5 of the audio track. Logic will now ask for the files' location via the standard operating system file dialog.
- Browse to the drive and folder that contains the tutorial drum Loop—"Atmo-Drums.wav".
- Double-click on this file and it will appear in the Arrange window.

- As an alternative method, you can resize Logic. With both your desktop and Logic visible, you can browse to the Logic program folder and simply drag 'n drop the "Atmo-Drums.wav" file to the desired location in the Arrange window.



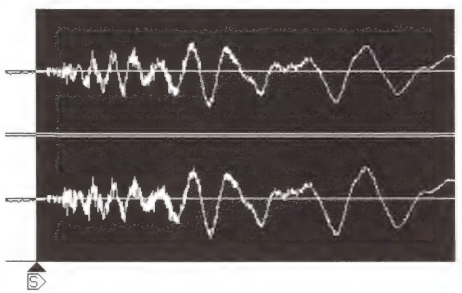
If you enlarge the display through use of the zoom bars or telescopes, you will see a waveform display in the audio sequence that was just imported. The audio file name is displayed above this waveform overview. A symbol indicating whether the file is mono or stereo will be shown at the end of the file name. Stereo files are indicated by two interlocked rings.

Start playback from measure 5, using one of the navigation techniques learned earlier. At this point, you should be hearing the audio file and will notice that the speed of the MIDI tracks and the drum loop are out of time with each other. We can fix this by adjusting the speed of the song.

3.8.5 Sample Editor

Open the Sample Editor by double-clicking on the drum loop region in the Arrange window (or using the Key Command *Toggle Sample Editor*, default W, on a selected Region). For precise editing of audio, this is the window to use. You'll notice that the starting point of the drum loop's waveform is not exactly aligned the first beat of measure 5.

- Enlarge the Sample editor display with the zoom bars or telescopes until you can see the waveform startpoint precisely.
- Move the start playback indicator—the small *S* icon below the waveform—so that it is perfectly aligned with the beginning of the waveform, as shown.



- Now press the button featuring the loudspeaker symbol, to listen to the audio file.

The startpoint should now be correct, but the audio region's end point must still be corrected. It must be moved forward (to the left) until the drum part loops smoothly. The best way to check this is by engaging "cycle" mode in the Sample editor. Do so by pressing the button shown.

- Scroll to the end of the drum loop and move the end point back (i.e. to the left). To do so, drag the end playback indicator—the small *E* icon below the waveform—until there are exactly two measures between the start and end points.

You should optimize the beginning and end points until the loop actually cycles smoothly. It should be noted that this can be done as the audio file is actually playing, which makes setting loop boundaries much easier. Listen to the loop and adjust these points until it cycles perfectly. This is very important, as the loop's length will be used to adapt the tempo of the song to the audio file.

Important!

- Once you're done, disengage the speaker button (by clicking on it again) and return to the Arrange window by closing the Sample Edit window.
- In the Transport Bar (or Bar Ruler), set the locator points to cycle between measures 5 1 1 1 and 7 1 1 1.
- Select Options > Tempo > Adjust Tempo using object length & Locators, or press T.

- At this point, you will be asked whether the tempo for the entire song (global) should be changed to match the audio file, or whether a tempo change should be inserted at the left cycle point, 5 1 1 1. If *global* is selected, your arrangement should look similar to this:

- Press *Play*. You'll notice that the song speed has adapted precisely to the drum loop, which you just defined using the locator points. The drum loop is two measures long. The length and position of the audio region (audio sequence) now corresponds exactly to the start and end point changes made in the Sample Editor.

You can move, cut, and copy the audio region in the Arrange window, just as with MIDI sequences. Please experiment with this, making use of the Undo function as you go.

As mentioned earlier, despite the similarities, the handling of MIDI and audio is slightly different. As such, the Matrix and Score editors, plus a number of MIDI-specific functions are not applicable to audio regions.

3.8.6 The Audio Window

Put simply, the Audio window allows to you to manage all audio files used in the open song. Press ⌘9 to open this window or browse to it via the Audio > Audio Window menu option—or switch to Screen Set 7 in the default Song created by the Logic Setup Assistant.

The Anchor

The changes you made to the "Atmo-Drums.wav" file in the Sample Editor have aligned the audio region in the Arrange window to position 5 1 1 1. While you can move the audio region directly in the Arrange window, by dragging it or using the *Delay* parameter in the region's Parameter Box, you can also make use of the Audio window to adjust the *Anchor* point.

The *Anchor* point of each audio file has a direct impact on the audio regions which point to the file. To illustrate this, position your windows in a way that allows you to view the "Atmo-Drums.wav" region in the Arrange window and the "Atmo-Drums.wav" file in the Audio window.

- Select the "Atmo-Drums.wav" region in the Arrange window.

- Click-hold on the *up arrow* beneath the "Atmo-Drums" waveform overview in the Audio window, and drag it to the right.
- Release the mouse button around the center of the waveform graphic while keeping an eye on the audio region in the Arrange window. As you can see, the entire region was moved to the left.
- Select Edit > Undo to reverse the process.

In moving the *Anchor* point, you have adjusted the audio region's temporal (time) reference point. The *Anchor* can be used to quickly select the "downbeat", for example, in a looped drum region in your arrangement.

The *Anchor* point can not be positioned before or after the *Sample Start* and *End* points, respectively.

Quick and Dirty Audio Regions

You can define region start and end points in either the Audio window, or directly in the Arrange window. Either method is useful for roughly defining a region's size. If you need precise control over the audio region/audio file start and end points (for loops etc.), please make use of the Sample Edit window.

Before commencing this exercise, please ensure that both the Audio and Arrange windows are visible.

- In the Audio window, select the tool which looks like a hand with an extended index finger.
- Click-hold on the left or right hand end of the "box" which encompasses the "Atmo-Drums" waveform overview, and drag horizontally. As you do so, the "box" will increase/decrease in size.
- Once the desired location has been reached, release the mouse button. While doing so, keep an eye on the audio region in the Arrange window.
- Now, in the Arrange window, select the Arrow tool, and grab either the left or right hand end of the audio region. As you do so, the cursor is shown as a hand with an extended index finger, and the region will increase/decrease in size.
- Once the desired location has been reached, release the mouse button. While doing so, keep an eye on the audio file overview in the Audio window.

Important!

If the Sample Edit window was also opened, you would see that the adjustments made in the Audio window adjust the *Sample Start* and *End* points. Adjustments made in the Arrange window, however, do not alter the *Sample Start* and *End* points. The reason for this is that the Arrange window only deals with *audio regions*, not *audio files*. The Sample Edit and Audio windows, on the other hand, deal with the underlying *audio files* on which the *audio regions* are based.

Audio File Menu

This menu provides a range of file handling tools, including delete, backup, conversion and more. These tools can aid you in "housekeeping" tasks for all of the files used in the song. Please refer to the Logic Reference manual for detailed information on each function.

3.8.7 The Digital Factory

The Digital Factory is a collection of audio processing tools which can be used for a number of tasks, including pitch shifting and time stretching of audio material. You may follow this section now, or return to it at a later stage.

- Reopen the Sample Editor by double-clicking on the drum loop region in the Arrange window.
- Click on the Factory menu and take a look at the various options, one by one. The Reference manual contains detailed information and examples on the use of these tools, which you should consult while doing so.
- Please feel free to experiment with the various processes, making use of the Undo function as you work through them.

The Time and Pitch Machine (time-stretching) functionality is also available directly in the Arrange window. Please consult the Reference manual for details.

3.8.8 Making Your Own Audio Recordings

First, connect the sound source—a mixer, CD player, or microphone, for example—to the audio inputs of your system. Create a new audio track, using the method described in the *Creating Audio Tracks* section, from page 113 onwards.

Arming Tracks

Unlike MIDI tracks, audio tracks must be "armed" before they can be recorded to, just as the tracks on a tape recorder must first be armed. There is a small button marked with an *R* to the left of each audio track in the Track List. Clicking on this icon prepares the audio track for recording. The *R* button will turn red, indicating that the track is armed. You can also click on the *REC* button on an audio channel in the Track Mixer, in order to arm the appropriate audio fader/track.

Setting a Record Path

Unless you've already configured your audio path, the following dialog will open. Key Command A.

Click on *Set* for your audio devices, and in the dialog window that appears, select the name of the audio file (by default, this is "Audio") and path—i. e. hard disk location—for your recordings.

Global and Song Record Paths

If a *Global Recording Path* is set, you do not need to repeat this procedure before every recording. Subsequent recordings will automatically be assigned the same name, with a number appended to the end of each file created. To do so, click-hold in the panel above the *Set* button. This will open a flip menu where you can select a *Global* or *Song Recording Path*. Please select the *Global Recording Path*, for now.

As you work with Logic, you will generate a great deal of audio data. To aid you in managing this data, we suggest that you make use of the *Song Recording Path* option, and follow the tip below.

Tip

It is recommended that you set up a different file name (and folder) for each new song you create, so that the song title and the audio files used in it are the same. As an example—The "rocksteady" song should be in the "rocksteady" folder. Your default audio file name should also be "rocksteady", and be *Set* to record into this folder.
The advantage of working this way is that all songs and audio files associated with a particular project are contained in one place, and have an associated (or the same) name. This makes things much easier to find, if returning to a project after a period of time. It is also beneficial for archiving purposes.
The ideal tool for this type of song and file management is the Project Manager. Please consult the Logic Reference manual for details.

The *Global Recording Path* is saved with the Preferences, and will be used as the "default" path the next time Logic is launched.

The *Song Recording Path* is saved with the Song file, and will be used as the "default" path the next time the specific Song file is loaded.

Using the Audio Object Name

This option in the *Audio Record Path* dialog allows you to make use of Logic's ability to rename audio objects, as discussed in the *Creating Audio Tracks* section, from page 113 onwards. Such object names will then be used for audio files. As an example, if an audio object was named "Drums", then all audio files recorded to that channel would automatically be named "Drums", "Drums1" a. s. o. This facility becomes even more useful when used in conjunction with the *Song Recording Path* option.

Stereo Recording

To make a stereo recording, you must first configure the selected track's audio fader as stereo in the Track Mixer, or Audio layer in the Environment.

- Open the Track Mixer and click on the symbol to the left of the *REC* switch, on the *highlighted* audio fader. This will toggle the track between stereo and mono.

The symbol on the button indicates the current status as follows: A *single circle—mono*. A *pair of interlocked circles—stereo*. The level meter will also divide into two discrete meters, when an audio fader is set for stereo operation. While in the Track Mixer, note that there is now an additional "audio" fader. As you create new tracks—MIDI or Audio—in the Arrange window's Track List, a new corresponding fader will be created in the Track Mixer.

It should be noted that the underlying objects, on which the Track Mixer channels are based, must first exist in the Environment window. Also of note are the different view options available to the Track Mixer, as discussed in the *Changing the Track Mixer View* section, from page 115 onwards.

- Once you're done with setting the *stereo/mono* status of the audio channel, close the Track Mixer.

Levels

As soon as you arm an audio track, you will hear any signal being sent to the audio inputs of your system. The audio track's fader in the Track Mixer controls the level of the monitored signal—i. e. what you're hearing.

The fader always controls the *playback* level, *not* the recording level. Recording levels must be set externally—i. e. on your mixer, or at the original sound source.

Important!

Care must be taken when setting input levels, as digital audio will "clip" when overloaded. Clipping results in particularly harsh metallic distortion, so unless you have a penchant for heavier musical styles, we don't recommend overloading the inputs.

Starting to Record

- Start recording by pressing the *Record* button on the Transport Bar, or by pressing ⊡ on the numeric keypad. You will notice that a waveform is drawn, in realtime, in the Arrange window during recording.

Keep an eye on the level meter on the audio faders. In the event that the clip indicator (top, red LED) lights up, you will need to record again, using a lower level. To avoid having to watch the level meter constantly; the overload indicator remains lit until it is clicked. If your recording level was too high, ensure that you click on the overload indicator to reset it.

- Once you've finished recording, press *Stop* on the Transport Bar or by pressing ⊟ on the numeric keypad.

Congratulations, you've recorded your first audio file.

Please do not forget to disarm the tracks after recording has finished. Do this by clicking on the illuminated (red) *R* button which will then turn gray. If the track is not disarmed, you will not be able to listen to the audio region on this track.

3.9 Mixer Functions

The Track Mixer (and the Audio layer in the Environment) can be fully automated. This automation allows a full "flying-fader" mixdown of all audio channels, master faders, busses, audio instruments and effects. This section covers the terminology and use of the various parts of the Track Mixer, and a brief look at the mix automation facilities available in this window.

Everything that you'll learn in this section (on an individual channel basis) also applies to the fader you can see on the left-hand side of the Arrange window.

Important!

Logic's Arrange window features an enhanced track-based automation system, which is covered in the next chapter. We strongly recommend the use of this Track Automation system over the use of the older methods of previous versions. If you're unfamiliar with these "old" methods, you won't have any "bad habits" to break.

3.9.1 Automatic Mixing

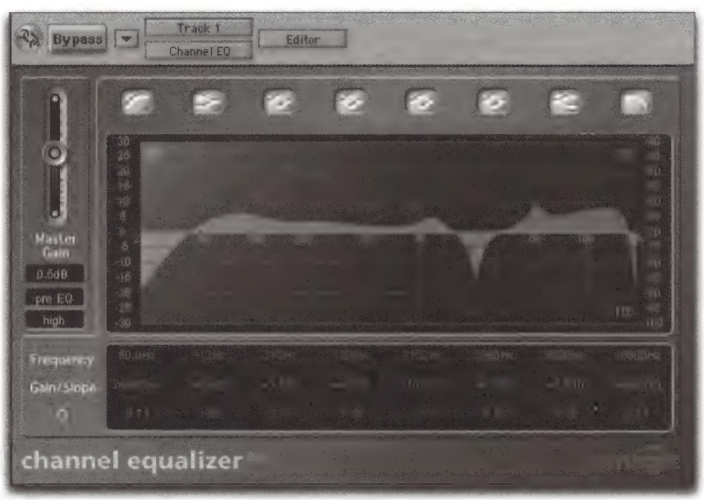
- Open the Track Mixer and the Arrange window. Resize both windows if necessary, so that you can see the Track List and a few of the faders in the Track Mixer.
  Although you can just make use of the Arrange Window Channel fader, having the Track Mixer open will allow you to see multiple channels—so keep an eye on both, and watch what happens when one or the other is changed.
- Select View > Track Automation. The Arrange window will zoom in vertically (select "Current Track" when prompted).
- Now click on any track in the Track List—MIDI or audio—and pay attention to the Track Mixer window. You will see that as you select a track in the Track List, the corresponding fader in the Track Mixer will be outlined in red (and the fader to the left of the Arrange window also updates to reflect the selection).
- Select the *Touch* option by click-holding on the panel above the Pan knob on the outlined fader—keep an eye on the Arrange window fader while doing so.
- To record changes to the volume, press *Play* on the Transport Bar (or use the Key Command) and move the "highlighted" fader up and down in the Track Mixer. As you do so, you'll see a curved line being created on a gray "bar" in the Arrange window (and the fader will move). Once done, press *Stop*.
- Return to the beginning of the newly recorded automation track, using any of the navigation methods you learned earlier, and press *Play*. Note that the fader on the Track Mixer (and the Arrange window fader—assuming the same track is still selected) is now replaying your recorded automation movements. This automatic playback of changes to the Track Mixer's channel parameters is often referred to as "flying fader" automation.
- The same automation method can be used for additional channels, pan knob position and also for the EQ parameters on audio faders. This also applies to plug-in automation, which we'll cover shortly.

3.9.2 Using the Equalizers

Equalization (EQ) is the process of boosting or cutting certain frequencies in an audio signal. EQ is used to make individual instruments or frequencies stand out (or the reverse) in an overall mix. Each audio channel in Logic features a number of parametric (or other) EQ options that are inserted into the top *Insert* slot of each channel. (You may also insert further EQ's in other available Insert slots, if desired). All EQ parameters can be automated.

The desired EQ type can be selected by double-clicking on the EQ button at the top of each channel. This will automatically insert it in to the first available Insert slot. It can also be inserted by click-holding on the top Insert "slot" (or others, if you wish, but for now, use the top Insert slot). Browse through the flip menu that will open, and select the Mono > Logic > EQ > Channel EQ.

It doesn't matter if either the Mono or Mono > Stereo version is selected, at this stage. Obviously, if you are editing a stereo track, you should select the stereo option, and vice-versa for a mono track.



The insertion of the Channel EQ into an Insert slot will launch the Channel EQ plug-in window, shown above.

If the Track Mixer fader or the Arrange Window Channel is visible, you'll notice a small "thumbnail" of the Channel EQ at the top of the channel strip. This gives you an instant overview of the Channel EQ settings. (Please note that in case of multiple instances only the topmost Channel EQ can be displayed by the thumbnail.)

The *Bypass* button is used to bypass or activate the EQ. The other parameter panels are described below:

Setting EQ Parameters

The "*Band Type*" buttons above the display switch individual bands on or off.

You can set/adjust the band parameters either directly in the central EQ display, or in the parameter area below it. As you move the mouse horizontally over the display, pivot marks for individual bands appear on the frequency axis, while the parameter area of the same band is highlighted. The following possibilities are available for changing the parameters of a band:

- Move the mouse horizontally over the display until the desired band is highlighted. Now click-hold the mouse button on the display background (not directly on a pivot point): vertical mouse movements change the *Gain*, horizontal movements change the *Frequency* of this band.
- Click-hold directly on the (illuminated) pivot point of the desired band: vertical movements (up/down) change the *Q* value. The direction required to increase or decrease the *Q* value depends on whether you are above or below the zero line (this ensures that "up" increases, and "down" decreases the volume in this band—you will find this intuitively "correct"). Again, horizontal movements (left/right) change the *Frequency* of the band.
- Click-hold on the desired parameter in the parameter area below the graphic display (*Frequency*, *Gain/Slope* or *Q*): Moving up increases, and down decreases, the value. In order to prevent accidental changes, this is the only way to change the *Slope* value of the high and lowpass filters (bands 1 & 8).

As long as your mouse arrow is in the access area of a band, its individual curve will be graphically inserted over the resulting curve of the entire equalizer.

You can also edit Channel EQs via the Logic Control—by pushing the EQ button: this will open the first Channel EQ of the selected channel. If no Channel EQ is active/available, it will automatically be inserted in the first free insert slot.

Parameter Description

The maximum *Gain* per channel is *±24dB* (exception: bands 1 and 8, see below), the *Frequency* ranges from *20Hz* to *20,000Hz*. The range of *Q* values depends on the band. The individual bands are defined as follows:

- Band 1 is a highpass filter and band 8 is a lowpass filter. The *Slope* parameter can either be *6*, *12*, *18*, *24*, *36* or *48dB/Oct*(ave) and *Q* ranges from *0.10* to *100*.
- Bands 2 and *7* are shelving equalizers. Their values for *Q* (steepness of their curves) range from *0.10* to *2.00*.

- Bands 3—6 are so called "bell" or "peaking" equalizers. *Q* can range from *0.10* to *100*. When set to *100*, the equalizers only apply to a very narrow band, and can work in a similar fashion to notch filters.

If *Show EQs* is activated in the parameter box of a channel, it is possible to see a thumbnail view of the Channel EQ displayed in the upper corner of a channel strip.

You can reset the settings of a Channel EQ band by alt-clicking in either the display or parameter area.

Master Gain

This fader adjusts the output level of a Channel EQ. This allows you to compensate for level changes introduced by your EQ settings. *Master Gain* has a range of *±24dB*.

Analyzer Parameters

These functions are for advanced use, and are covered in detail in the Reference manual. For now, don't worry about them.

Using the Channel EQ—an Example

- Select the drum loop in the Arrange window.
- In the Transport Bar (or Bar Ruler), set the locator points to cycle between measures 5 1 1 1 and 7 1 1 1.
- *Solo* the drum loop.
- Launch the Track Mixer from the Windows menu or by switching to default Screenset 2.
- Activate the Channel EQ on the highlighted Audio channel.
- Experiment with different values in each of the parameter fields described above.
- Try to isolate the kick (bass) drum, hi-hats and clap sounds, through careful use of the *Q* and *Frequency* values. If possible, reduce/increase the gain (*Gain/Slope*) to hear the individual parts of the loop in isolation. Experiment with different *Band Type* options to see how they affect the EQ.

3.9.3 Inserting Audio Effects

The internal audio effects of Logic can be inserted into the individual audio channels—regardless of type—by selecting the desired effect from a flip menu, accessible via the *Insert* "slot"(s) found on each audio channel strip. To insert an effect:

- Open the Track Mixer, or launch the Audio layer of the Environment (Screenset 3 of the default Song). Alternately, use the Arrange Window Channel Strip.
- Once a "mixing surface" is open, click hold on any of the *Insert* slots on the audio channel, and a hierarchical flip menu will open, displaying the various effects, grouped in categories. Usually, you would insert effects from the top slot down.
- Highlight the category, and then the effect you wish to use in the flip menu, and release the mouse button. The *Insert* slot will turn blue, with the name of the selected effect displayed.
- To remove a plug-in from an *Insert* slot, click hold on the desired slot and select *No Effect* from the flip menu.

How Effects Are Grouped

Logic "groups" effects as follows:

- Audio Channel Type—either Stereo, Mono/Stereo or Mono.
- *Stereo*: Stereo in, stereo out (True stereo). Both input signals are processed separately, so the stereo qualities of the signal remain unchanged—this is important for summed or stereo bus signals used as inserts.
- *Mono/Stereo*: Mono in/Stereo out. For use with mono signals only, but the effect output is stereo. Commonly used on the following mono signals: Chorus for bass, Reverb for lead vocal.
- *Mono*: Mono in, mono out. Should only be used on mono signals. Typical applications are for EQ's or dynamics processing (Kick, Snare, Bass).
- By API—*Logic, AudioUnits*. Grouping of effects in this fashion makes the selection of effects simpler.
- By effect definition—*Dynamic, Modulation, Reverb, Filter* etc. The effect definition groups effects of a particular type together. As an example, Chorus, Flanging and Phasing are different types of *Modulation* effect. This only applies to "native" effects.

Tip

Logic automatically limits the available effect types shown in the plug-in flip menus to match the audio object's signal I/O settings. In other words, if an audio object is mono, then *only* mono (and mono/stereo) effects will be available in the plug-in flip menu. This also applies to stereo audio objects with *only* stereo plug-ins being available. It is possible to override these settings by pressing and holding ⌥ before selecting the plug-in flip menu on an audio object.

Important!

If you choose to use a plug-in which does *not* match the audio objects' signal I/O flow, Logic will be forced to do a data stream conversion, which places a greater strain on the CPU. This translates to fewer simultaneous effects, so keep this in mind.

3.9.4 The Plug-in Window

You can edit the effect's parameters by double-clicking on the (active) *Insert* slot, which will launch the plug-in window. Many of Logic's effects feature an enhanced graphical interface—as you've already discovered with the Channel EQ.

By default, the plug-in window will automatically launch as soon as any plug-in is inserted. The double-click will reopen the window if you have closed it.

Please refer to the Reference Manual for specific information on the individual effects, their parameters and their use.

Effects Settings

Settings are used to store all parameter adjustments you make in the plug-in window. Every Logic and third-party plug-in allows the storage and recall of Settings. Effects Settings are accessible by click holding on the *Settings* flip menu (the downwards-pointing arrow) beside the *Bypass* button in the plug-in window.

- Within the *Settings* flip menu you can load an effects "preset" via the *Load Setting* option.
- To save your own personalized effects settings, adjust the parameters of the open plug-in window by click holding on any parameter, and moving the sliders/knobs. Once your parameter adjustments have been made, click hold on the Settings flip menu and select Save Setting. In the ensuing operating system file dialog window, type in an appropriate name for your Setting, and press the *Save* button. Please give this a try.
- You can also use the *Settings* flip menu to copy and paste parameters between Settings.

Logic automatically creates a folder called "Plug-In Settings" when first installed. Within this folder, a separate folder for each effect is created. When you use the save/load preset functions in the Settings flip menu, Logic will automatically save/load the Setting file to/from the corresponding effect folder. As each effect Setting is stored in its own associated folder, you should find it easy to manage hundreds of presets. This feature is applicable to all Logic and third-party effects.

Important!

It is recommended that you do not attempt to change the folder structure within the "Plug-In Settings" folder.

Reassigning Plug-in Windows

Rather than opening a separate plug-in window for every effect on every channel—which would involve a lot of effort and require massive amounts of screen space—you can reassign any open plug-in window in two different ways, using the two flip menus in the gray area of the plug-in window:

- Using the *upper flip menu* (typically showing a channel name) you can switch the editor window between all channels using this specific plug-in. E. g. if you have applied a Compressor to tracks 1/2 and 3/4, you can switch between these channels and adjust the parameters independently for each instance of the Compressor.

- In the *lower flip menu* you can switch between the plug-ins selected for that specific channel. E. g. if one channel uses a Chorus and a Delay plug-in, you can switch the window between the two effects.

Changing the Plug-in Display

Many—although not all—of the effects feature an *Editor* button which allows you to toggle between the graphical "Editor" and the *Controls* view of the plug-in. The Controls view displays *all* of the plug-ins parameters, and often saves space onscreen.

The Controls and Editor views of the Tape Delay plug-in. If there are any parameters preceded by an asterisk (*) at the bottom of the Controls view, these parameters are not visible in the Editor view.

Additional Plug-in Window Options

The gray area of the plug-in window displays a *Link* button and a *Bypass* button, and *may* contain an *Extra Controls* button, shown in the centre of the image. To explain their use:

- Insert a plug-in in the first *Insert* slot of the first Audio channel, if you have not already done so. This will launch the plug in window.
- If the plug-in window doesn't automatically launch, double click on the illuminated *Insert* slot.
- Now insert a different plug-in into the second *Insert* slot of the audio channel. You will notice that the open plug-in window updates to show you the newly selected plug-in.

- Click on the *Link* button to the left of the gray plug-in window area.
- Now insert a different plug-in into the third *Insert* slot of the audio channel. You will notice that the a new plug-in window is automatically spawned for the newly selected plug-in.
- These two plug-in window behaviors may be useful for different tasks, when assigning effects and mixing in Logic.
- Click hold on the first *Insert* slot, and select the Logic > Delay > Tape Delay plug-in, and launch the plug-in window if one is not already opened.

The *Bypass* button is used to "bypass" the effect. This is useful for allowing comparisons of an audio signal with and without the effect. Bypassing an effect is achieved by simply clicking on the *Bypass* button when in the plug-in window.

Tip

If you wish to bypass an effect when no plug-in window is opened, press ⌥ and click on the desired channel's *Insert* slot. The bypassing of any plug-in can be automated, so remember this option if the effect is not in use during a particularly "busy" part of your song, and you need more processing power—i. e. if there's a lot of other effects and/or softsynths in use.

3.9.5 Using the Effect Buses

Effects on Audio Track, Audio Instrument and Audio Input channels can be routed to Audio Return (Bus) channels. These Audio Bus channels can, in turn be routed to other Bus channels or Master Outputs. To "send" an Audio Track, Instrument or Input to a Bus:

- Click hold on any of the *Bus Send* slots, and a hierarchical flip menu will open, displaying the available Buses.
- Highlight the desired Bus number, and then release the mouse button. The *Bus Send* slot will turn blue, with the name of the selected Bus displayed. A small knob will appear to the right of the *Bus Send* slot. This is the *Send Level* control. It determines the amount of signal which is sent from the Audio channel to the Bus channel.
- To adjust the amount of send level, click hold on the knob and drag your mouse to the right. You may also press ⌥ and click on the knob which will automatically set it to a value of *90*.
- Insertion of an effect on a *Bus channel* is as per effect insertion on the other audio channel types.

Serial and Parallel Effects Setup

To offer a brief description:

- In a *Serial Configuration*, the output from one effect is summed with its incoming signal and fed into the input of the next effect in a chain. A series configuration will occur in Logic when you insert multiple effects into subsequent *Insert* slots on a single audio or Bus channel.
- In a *Parallel Configuration,* the Bus Sends from each channel are fed to multiple Bus channels (with inserted effects) simultaneously.
- The results from these two methods of adding effects to an audio source is dramatically different, even if the same effects are used, in the same order.

Tip

You can set up effects—in series—on a single bus, which work exactly like the Inserts on a single channel. This way, you can route multiple audio channels through one bus, with a particular serial effects combination, saving you time in setting them up, and also conserving CPU resources.

This type of flexibility allows you to combine different effects in different ways, so that you can build your own complex multi-effects, which are saved as part of your song files. You may wish to set up such a configuration and save it in your Autoload song.

3.9.6 What Sort of Effects Go Where?

Although there are no "unbreakable rules" about what effects types should be used, there are a number of traditional uses which make sense. The amount of processing power required for particular types of effects—particularly reverbs and Logic Platinum's Spectral Gate—demand that they be used judiciously.

Traditionally, reverb effects are inserted into Buses, allowing multiple tracks to make use of a single reverb "unit". As the *Send Level* knobs on each audio channel can be used to control the amount of signal sent to the Busses, the amount of reverb applied to each channel's signal can be varied. This traditional use makes sense in Logic too, given the CPU resources required by the reverb effect.

As a quick note, Logic 6's *Freeze* function allows you to "print" the output of an Audio or Audio Instrument channel to a "freeze" file—complete with individual reverb (or any other) effect, saving massive processing resources. Please consult the Logic Reference manual for details.

Dynamics processing and equalization is generally applied on a per-channel basis. The CPU requirements for these types of effects are far lower than that of a reverb.

Other effect types, such as modulation processes—chorus, flanging etc.—can be used in either the Bus or channel *Insert* slots, but are generally used on Buses. Delays are commonly used on Buses—except very special settings for just one channel. Filter effects are usually channel-based.

For effects that do not incorporate a level control, these are best suited to use on Bus channels.

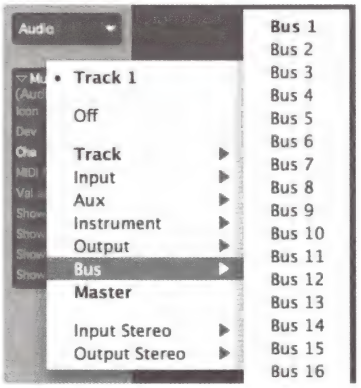
Feel free to make your own choices, based on what provides the "right" sound for your music, but please take the processing requirements and channel status—mono, mono/stereo/stereo—of the signal path into account.

3.9.7 Audio Instruments

The next thing we'll look at is the use of the Audio Instruments. Audio Instrument channels are designed for use with software based synthesizers (ES1 and 2), samplers (EXS24 MkII), instruments (EVB3, EVP88, EVD6) and the EVOC 20 vocoder, for example.

To create an Audio Instrument track:

- Select the "Piano" track in the Track List, and create an audio track in the Arrange window via the Functions > Track > Create menu option, or by pressing ⇧⏎. In the Arrange window, a new track will appear below the piano track.
- Click-hold on the "CHA 1" entry in the Track List, and a hierarchical menu will open.
- Browse to Audio > Audio Track > Audio 1, and release the mouse button. This will assign the track to the first Audio channel.
- Double click on the Audio 1 Track, which will launch the Environment window's Audio layer.
- Click once on the background of the Environment window, which will deselect the Audio 1 object.
- Create an Audio Object by selecting New > Audio Object. This will generate a small "waveform" icon onscreen.
- Double-click on the icon to change its appearance to an audio fader.
- Clicking on the *Cha* entry in the Audio object's parameters box will allow you to select an Audio Instrument object via a hierarchical menu, as shown in the following diagram.



- Once you have selected Audio Instrument 1, release the mouse button.

Click hold on Audio Instrument 1's top *Insert* slot, and select the mono > es-m synth. Also available from Emagic are the ES 1, ES 2, EXS 24 MkII, EVP88, EVD6 and EVB3 software instruments, which can be purchased separately.

Tip

It should be noted that if an Audio Instrument object already exists within the Environment (on the Audio layer) it can simply be selected from the hierarchical flip menu in the Track List.

- Once you've made your selection, your synthesizer's plug-in window will launch, and as you'll discover, there are lots of knobs, sliders and more to experiment with. This we'll let you try on your own.
- To actually record some new music using your selected Audio Instrument, you need to return to the Arrange window, so for now, close the Track Mixer window.
- Recording Audio Instruments is just like recording MIDI instruments, so simply press *Record* on the Transport Bar (or use the Key Command—[*]) and start playing your MIDI keyboard.
- Once you're done, press *Stop*.
- Audio Instrument tracks can be edited in the same fashion as MIDI tracks, although there are some small differences, as discussed in the next section.

Remarks on the Use of Audio Instruments

Audio Instruments generally use more CPU resources than traditional effects, so you need to be judicious about their use, particularly if your computer isn't a cutting-edge machine. Follow these tips to reduce system load if you find your system struggling and your audio or Audio Instruments start to 'glitch' on playback.

Logic includes a "Freeze" function which is helpful in reducing the amount of processing power required for Audio Instrument and effect playback. This is a more advanced function that is covered in the Reference manual, but should you find that your CPU can't cope with the demands being placed on it, consider the Freeze or Bounce functions. More on Bouncing is found in *The Final Mix* section, from page 155 onwards.

Please note that muting an Audio Instrument track in the Arrange does *not* reduce system load. You can, however, bypass the instrument by pressing [⌥] and clicking on the Audio Instrument channel's *Input* slot. The bypassing of an Audio Instrument can be automated, so remember this option if the synth is not in use during a particularly "busy" part of your song—i.e. if there's a lot of other effects and/or softsynth use.

When an Audio Instrument track is selected, it is ready to be played in realtime and consequently produces an amount of system load. Normally, Logic releases system resources used by the Audio Engine when the sequencer is stopped. This is not the case, however, if an Audio Instrument track is selected in the Arrange window, and is available for real-time playing. Selecting a MIDI track or a standard audio track exits this "stand by" mode and releases reserved system resources, when the sequencer is stopped.

Audio Instrument tracks can be processed by the *Quantize, Transpose* or *Delay* sequence parameters in realtime.

To hear Audio Instrument plug-ins in conjunction with plug-in effects, Logic must be in play mode. As with all of the other plug-ins in Logic, you can alter the parameters of the Audio Instruments and save your own *Settings* for later recall. Please read the *The Plug-in Window* section, from page 129 onwards.

Important!

You may notice a delay between playing your keyboard and hearing the sound. This is a form of "latency". Please refer to the separate Installation Guide for tips on adjusting your audio card settings to minimize this latency. It should be noted that you may not be able to completely eliminate this "gap", as this form of latency is completely reliant on your sound card's driver.

A Quick Word on the Included Instruments

The three synthesizers provided with Logic are briefly described below. Coverage of all parameters can be found in the online help system and Reference manual.

- The es-m is a monophonic "bass" and lead sound synth, modelled on the venerable Roland TB-303 Bassline, but offering a number of enhancements on the original.
- The 8-note polyphonic es-e is great for warm and lush "pad" sounds.
- The es-p is also polyphonic, and is well suited to the creation of finely-crafted percussive sounds with fast attack phases, pads, brass and more. It offers a number of creative facilities over the other two synthesizers, making it the most versatile of the three.

3.9.8 Plug-in Automation

Parameter adjustments of all effect plug-ins, including software-based Audio Instruments, can be recorded and played back in realtime, just like the level faders and pan pots on audio channels.

The procedure for effect parameter automation is as follows:

- Open the Track Mixer or switch to Screenset 2 (default).

- Select *Touch* or *Latch* mode from the panel above the pan knob on the audio channels with the plug-ins you want to automate.
- Double click on an *Insert* slot which contains an effect. (Insert one, if none are active.)
- Press *Play* and move the sliders and knobs in the plug-in window. An automation track will be recorded, but will not appear in the Arrange window.
- Press *Stop* when done.

Tip

The newly created automation data can be seen by selecting View > Track Automation, and by then selecting the appropriate "slot" and parameter in the top panel of the track—in the channel's Track List entry in the Arrange window. More on the automation system is found in the next chapter.

3.10 More Files to Try Out

The "Audio Tutorial" song file—located on the Emagic Demo Songs CD—is an example of a combined MIDI /audio arrangement, based on the original MIDI Tutorial song. The delay and quantizing parameters of the MIDI tracks were changed, as the swing groove value originally chosen does not work well with the drum loop. Effects from the Track Mixer were added to the drum loop and rap sequence. Load it up.

There is a stereo file named "Audio Tutorial (2 Track)" on the Logic CD. This is the outcome of edits to the audio portion of the tutorial. This is a mini audio master of the "Audio Tutorial" song file.

3.10.1 Now It's Your Turn...

If you've worked through the Tutorial up to this point, then you should have a good overview of Logic's most important functions, and a working knowledge of its operation.

The Reference manual and on-line help system provide detailed information on the different parts of Logic. Please make use of this documentation if you need specific assistance on any function or parameter. Given what you have learned throughout the Tutorial and preceding chapters, you will benefit greatly by reading the Reference manual, to flesh out your knowledge.

Before leaving the Tutorial chapter, we'd like to thank you for sticking with it. Please run through it again, if you'd like more practice, or try out some of the suggestions below.

The Tutorial song contains useful source material for your own experiments. We encourage you to spend some more time working with it and that you give the following a try.

- Record more tracks—MIDI and audio (e.g. percussion, vocals), or Audio Instruments.
- Test out the different Audio Instruments, and create some of your own preset *Settings*.
- Replace existing tracks with your own recordings, e.g. piano, bass, drum parts.
- Create more audio tracks, and insert additional audio files.
- In the Sample Editor, experiment with the various Functions and Factory menu options, and listen to the results on a range of different audio files.
- In the Track Mixer window, use the Bus and channel *Inserts* to add effects to the audio tracks. Experiment with different delay, reverb (and other effects') parameters by entering their plug-in window editors.
- Look for mistakes in the sequences, and remove them by using the various editors.

That concludes our Tutorial, and this portion of the manual.

Have Fun.

4 Mix Automation

This chapter will introduce you to Logic's track-based mix automation functions. In preceding chapters, we looked at the *HyperDraw* function and the *Track Mixer* window for adjusting and automating mix and other parameters. These include volume and panorama changes, plus real-time changes made to effect parameters.

In addition, we've also explored the mute and solo, effect bypassing and other functions.

Logic Version 5 (and up) expanded on these facilities with an enhanced, elegant *Track Automation* system which is accessed directly in the Arrange window. Being able to perform virtually all recording, editing, arranging and mixing tasks in a single window is both convenient and efficient. This automation system can be used either "offline" or "live", which we'll discuss in this chapter.

The Track Automation system supports 32 Bit fader values which, in practical terms, means that it's very precise. This affords extremely detailed realtime, automated control over your Audio, Audio Instrument, effect and MIDI parameter settings.

All versions of Logic from 5.5 upwards natively support the Logic Control and Logic Control XT units. These hardware devices are connected to your MIDI interface and provide control over many Logic functions, including mixing, transport and more. Many of the procedures outlined in this chapter can be achieved more quickly and easily with the Logic Control (or other third-party devices). For further information, please visit *www.emagic.de* or contact your local Emagic distributor.

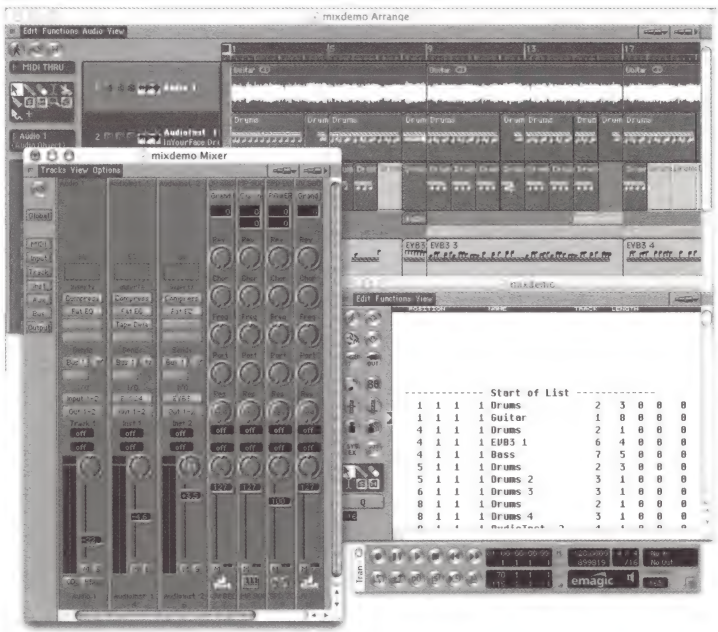
4.1 About the Mix Demo Song

As you work through this chapter, use the provided "Mix Demo" and "Mix Demo Edit "songs. Both songs feature a number of tracks configured for General MIDI (GM) tone generators. Please refer to the Tutorial chapter for information on adapting the song to your tone generator, if you do not have access to a GM unit.

The "Mix Demo" song also makes use of Logic's built-in software synthesizers, the es-m, es-e and es-p.

4.1.1 Load the Mix Demo Song

You can start the "Mix Demo" Song by starting Logic, selecting File > Open, and browsing to the song, or by double-clicking on the "Mix Demo" song icon in the Logic folder.



The Mix Demo song.

4.1.2 Play the Mix Demo Song

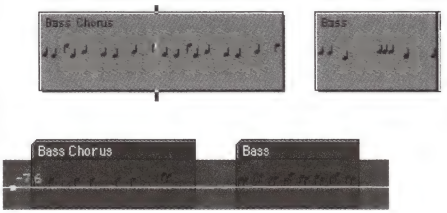
- To listen to the Mix Demo Song, simply press [0] on the numeric keypad.
- To stop the song, press the [=] key.
- To return to the beginning of the song, push [=], on the numeric keypad, while the song is stopped.

4.1.3 Song Screensets

A number of Screensets have been defined in the Mix Demo Song. Press the numeric keys [1] through to [5] to familiarize yourself with them.

4.2 Track Automation Basics

As the name suggests, Track Automation is tied to a specific *track* in the Track List of the Arrange window. When Track Automation is enabled, and an *automation event type* is defined on a given track, a transparent gray bar (automation track) will appear, aligned with that track. This transparent gray track runs the entire length of the song.



The images above show two sequence objects. The lower image is shown with Track Automation enabled. Note that the gray automation track runs across both sequence objects. Also note the percentage value 28.346. This is a 32 Bit fader value, ensuring incredibly accurate and fine control over parameters—filter Cutoff frequency, in this case.

4.2.1 Viewing Track Automation

Track Automation can be shown/hidden by selecting the View > Track Automation menu option.

- Please select Screenset 2, and toggle the Track Automation view. As you do so, you'll notice that the individual tracks will automatically resize vertically to accommodate the additional parameters shown on each track in the Track List. Relative size differences between zoomed and unzoomed tracks is retained.
- Switch to Screenset 1. As you can see, the hide/show status of Track Automation data is specific to each individual screenset which contains an open Arrange window.
- Switch back to Screenset 2.

4.2.2 Important Information

Logic's Track Automation is discrete from the *Record* function for Audio, Audio Instrument and MIDI tracks. In other words, Logic does not need to be in *Record* mode in order to write new automation data to tracks. In addition, the track you wish to automate does not need to be selected in order for automation data to be written to it.

Track Automation data can be written "offline" or "online".

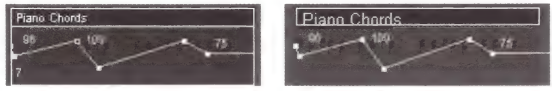
- *Offline*—means that Logic is not in *Play* or *Record* mode. When offline, you can use your mouse to insert "nodes" just as with the HyperDraw function. In fact, the Track Automation facility is an advanced version of the HyperDraw function.
- *Online*—means that Track Automation data is written "live" as Logic is running. This can be achieved using on-screen faders, knobs and switches in the Track Mixer and plug-in window, or with an external controller, such as the Logic Control.

Track Automation data can be "tied" to specific sequence objects or audio regions, allowing you to move a sequence/audio region and have the automation data move with it. Track automation data can also be completely independent of MIDI sequence objects and audio regions. The choice is yours. **Important!**

HyperDraw and Track Automation Compared

To illustrate the differences between the Track Automation and HyperDraw facilities, we ask that you read and try the following.

Both the HyperDraw and Track Automation functions allow you to visually insert (or record) a set of "nodes"—i.e. "dots" on the Automation track or HyperDraw "window". These "nodes" are automatically connected by both functions as a segmented line, as shown below.



HyperDraw is shown on the left, and the same data is shown in its Track Automation form on the right.

Numerical values for the current automation track are automatically displayed at nodes, if there is sufficient space between the nodes.

Numerical values are context sensitive (e.g. center of pan is displayed as *0* and not *64*, volume values are displayed in *dB*—decibels).

Important!

You can view both HyperDraw and Track Automation data simultaneously in the Arrange window *on different tracks*. If a MIDI sequence object or audio region which contains HyperDraw information is placed on a track with Track Automation enabled, the HyperDraw information will be "hidden". The HyperDraw information will still exist, but won't be visible.

Important!

To use HyperDraw (and do give it a try):

- Select the *Piano Chords* sequence at Bar 1.
- Open the View > HyperDraw menu and select Volume in the list, then release the mouse button.
- This will turn the *Piano Chords* sequence blue, provided it is "zoomed" in enough. Use the zoom controls to get a "close up" look, if the blue background is not visible.
- To insert "nodes", click directly in the blue area of the sequence at any points along its length with the *Pencil* or *Arrow* tool. This will insert Volume change messages at these "nodes" and a line will automatically "connect the dots".

You will note that the HyperDraw data is contained within the boundaries of the *Piano Chords* sequence. Please move the sequence to bar 5, and release the mouse button. Note that the HyperDraw data is moved with it. Return it to bar 1, once done.

- Now, select the *Piano Chords* sequence, and browse to the Options > Track Automation menu.
- Select the Move Current Object Data To Track Automation function, and release the mouse button. As you can see, the HyperDraw data you inserted has been "converted" to Track Automation data. This automation data track continues beyond the boundaries of the *Piano Chords* sequence. Also note that new information has appeared in the Track List panel beside the sequence.

As with the HyperDraw data, Track Automation data can also be moved with the sequence (or audio region). Please give it a try by dragging the *Piano Chords* sequence to the right. When you release the mouse button to "drop" the sequence, you will see the following dialog box.

Select *No* and pay attention to what happens to both the sequence and the Automation Track data. We will get to the other options in this dialog box shortly.

4.3 Track Automation Menu

The Track Automation functions are found in the Options > Track Automation menu.

Automation Settings...

Selecting this menu option will launch the following window.

The *Move Automation with Objects* parameter is a flip menu with the choices *Ask, Always* and *Never.* This is where you can set your preference for the behavior of the Track Automation system when you move objects. It is tied to the dialog box you saw a moment ago, when you moved the *Piano Chords* sequence.

Ramp Time is important for the "Touch" mode of faders. It determines the time (in milliseconds) that it will take a fader to smoothly return to its previous value, once you have released the fader. We'll get to fader "modes" in the *Track Automation Modes* section, from page 146 onwards.

"Write" Mode erases: determines the type of automation data that is erased when "Write" mode is active.

"Write" Mode changes to: determines the "mode" that the automation system automatically changes to when the "Write" mode has completed erasing the automation data.

Delete Functions

The Track Automation menu contains three delete functions. To illustrate these, please:

- Select track 5 of the Track List (The *Piano Chords* track).
- Click hold on the *Cha 1 Volume* panel of track 5 in the Track List.
- In the ensuing flip menu, select *Pan* and release the mouse button. While you have the flip menu open, browse through the two *MIDI Control* menus. Once you've released the mouse button, the panel will update to display the automation data type—i.e. "pan".
- Insert a few "nodes" along the length of the *Piano Chords* automation track.
- Now, select the Options > Track Automation > Delete currently visible Automation Data of Current Track option. The "pan" automation data for track 5 has been deleted, and will disappear from the Arrange window.
- Click hold on the *Cha 1 Pan* panel of track 5 in the Track List, and in the ensuing flip menu, select *Volume* and release the mouse button. You'll see that your *Volume* automation data was untouched by the deletion.
- Click hold on the *Cha 1 Volume* panel of track 5 in the Track List, and in the ensuing flip menu, select *Pan* and release the mouse button.
- Now, select the Edit > Undo HyperDraw menu option and confirm the "undo" in the ensuing dialog box, which will return your *Pan* automation track to its former glory.
- Browse to the Options > Track Automation > Delete All Automation Data of Current Track option. All of your *Volume* and *Pan* automation track data will be erased.
- Once again, select the Edit > Undo HyperDraw menu option and confirm the "undo" in the ensuing dialog box. This will restore your *Volume* and *Pan* automation track data.
- The final delete function is pretty self-explanatory. It deletes all data on all tracks, whether they are selected or not. Don't try it out, at this stage.

Move Functions

We introduced you to the Options > Track Automation > Move Current Object Data To Track Automation function when we "converted" the HyperDraw *Volume* information into Track Automation *Volume* data.

Where it differs from the Options > Track Automation > Move All Object Control Data To Track Automation function is as follows:

- The "current" object data of the top "move" function refers to the automation data type that is visible in the Arrange window, and the Track List panel.
- "All control data" is therefore pretty logical. In our deletion example, we created a *Volume* and *Pan* automation track. If we had used the "move all" function, both the Pan and Volume information would have been moved.

4.4 Track Automation Modes

Please select Screenset 1, and take a look at the faders in the Track Mixer. You will notice a black panel with the word *off* visible in it, just above the Pan control and the level meter. This is a flip menu which enables the different fader modes. Click-hold on the panel to view the options. Track Automation modes are available individually for all Audio Tracks, MIDI Tracks and Audio Instrument Tracks.

- *Off*—Automation is off. The fader will neither send nor receive automation data. Existing automation data remains untouched. It will still behave as a fader, however, and will adjust the volume or pan position etc. as usual.
- *Read*—The fader will read (follow) any existing automation data, but will not write data, regardless of any movements you make with the mouse or external control device.
- *Touch*—Writes new fader moves when the fader is "touched" during playback. This is obviously more relevant to a hardware device like the Logic Control, but also applies to the mouse. Any existing track automation data (of the current fader type) will be replaced by new movements as long as the fader is active—i.e. mouse button is depressed or a Logic Control fader is being touched.
- *Latch*—Similar to Touch mode, but the control remains activated, even when the fader/mouse is no longer being "touched". In other words, following the release of the fader, the current fader value will replace the existing automation data as long as the sequencer is in playback mode. Press *Stop* to finish.
- *Write*—Overwrites ALL existing automation data of the data types selected in the automation settings, or creates new automation data. Only use it if you wish to destroy all existing automation data of the selected types.
- *MIDI*—Disconnects the fader from the Track Automation. The fader will act like a standard external MIDI control source and will be recorded and played back as normal MIDI data in MIDI sequences.

Important!

When Logic is not playing—i.e. it is in *Stop* mode—the Automation write modes are ignored and *no data is written* if the fader is moved. If there are no dynamic changes (i.e.—no movements of the fader), the current fader setting becomes valid for the whole song. This is always the case when you start a fresh song.

- Please select Screenset 2. In the Track List of the Arrange window which is displayed, you will notice that the *Audio 1, AudioInst 2* and *Warm Pad* tracks—tracks 1, 2 and 6—have been resized.
- On the *Audio 1* track, you'll notice a yellow "fader" to the right. This is ideal for "set and forget" setting of Automation data values/levels, saving you the trip to the Track Mixer window. This Track List fader automatically updates to "follow" changes to the currently visible automation track data. It can also be used for writing automation data, but you may find the Track Mixer or the Arrange window's fader (to the left of screen) more convenient to use.
- The *Warm Pad* track also features a similar fader to the right. In this case, it is assigned to *Pan.*
- Click hold and drag on both to see how they visually change. Also note the automation track "line" while doing so.
- To the bottom left of the *Audio 1* and *Warm Pad* tracks, you'll notice a small panel with the word *Off* written in it. Click hold on this panel on the *Audio 1* track.
- As you can see, this flip menu is identical to that in the Track Mixer, allowing you to select the desired Automation mode directly in the Arrange window.
- On the *AudioInst 2* track, you'll notice that the Automation mode panel is missing. Click briefly to the right of the *AudioInst 2* track name, to select the track.
- Now, move the cursor towards the bottom left hand corner of the *AudioInst 2* track and keep an eye on it. When it changes into a hand with an extended index finger, click hold on the mouse button and drag down. This will resize the track.
- Release the mouse button when the desired vertical track zoom size is reached/when you can see the Automation mode panel.

4.5 On/Offline Automation

We have mentioned "live" and "offline" automation throughout the chapter. To explain further:

4.5.1 Online or "Live" Automation

Online/Live creation and editing of Track Automation data is achieved by the use of a "controller" while Logic *is* in Play or Record mode.

A "controller", in this sense, could be a physical fader or knob on a hardware device such as the Logic Control. A "controller" could also be a software fader, slider or knob found in Logic's Track Mixer (or Environment).

Important!

This "live" method of writing and editing Track Automation data is much more intuitive, not to mention faster. In essence, you "perform"—quite literally—your mixes in real-time as you're listening to your music.

Writing "Online" Automation Data

- Please switch to Screenset 1.
- Select the Arrange window title bar to bring it to the foreground and select the View > Track Automation menu option.
- Click hold on the *Read* mode label of the *Audio 1* fader in the Track Mixer window.
- Change it to *Touch* mode.
- Start playback of the song.
- Grab the volume fader of the *Audio 1* channel in the Track Mixer window, and adjust it as you're listening to the playback. Keep an eye on the *Audio 1* track in the Arrange window.
- Stop playback when you're done.
- Return to the beginning of the song and press *Play* and watch your Track Mixer faders.
- If you don't like your mix automation, simply start playback again and overwrite your existing data with new data.

Note that if you do overwrite your existing data, the fader will still be in *Touch* mode, so you will need to continue "touching" it while overwriting the data.

Tip

Try out the other modes on this, and the other tracks.

4.5.2 Offline Automation

Offline creation and editing of Track Automation data is achieved by the use of the mouse, when Logic *is not* in *Play* or *Record* mode. In fact, when you clicked in the *Volume* and *Pan* "nodes" on the *Piano Chords* track, you were creating "offline" automation data. As such, you already know the technique, so we won't repeat ourselves here.

The offline use of the Track Automation facilities is best suited to editing tasks on existing automation data. This said, however, it can certainly be used as the primary input method. It's your choice.

4.6 Automating Plug-in Parameters

You will notice that the *AudioInst 2* track also displays an Automation track assigned to *Cutoff*. This refers to the *Resonance Cutoff* control of the es-p synth assigned to this Audio Instrument channel.

Online Automation of effect and Audio Instrument parameters can only be performed in the plug-in window. You can perform "offline" automation of effect and Audio Instrument plug-in parameters directly in the Arrange window.

Important!

Any effect or channel parameter can be automated online, regardless of the *automation type* selected in the Track List. The display automatically switches to the parameter being written.

Important!

- Please double click on the es-p panel in the AudioInst 2 channel of the Track Mixer. This will launch the plug-in window.
- Set the appropriate "mode" (Touch or Latch) in the Track Mixer.
- Start playback and adjust the *Cutoff* knob in the es-p plug-in window by click holding and dragging (vertically) on it.
- Once you have completed your *Cutoff* automation, press *Stop*.

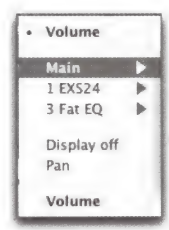
This technique can be applied to *any* effect parameter in *any "Slot"*.

4.6.1 Effects "Slots"

You will often use multiple effects on individual channels, busses etc. Each effect *Insert* slot is recognized, and enumerated by the Track Automation system. *Slot 1* is the top *Insert* "panel" on the channel fader, *Slot 2* is the second *Insert* "panel" a.s.o.

Tip

Slots are helpful aids for identifying and separating the parameters of each effect inserted on the channel. As an example of where this delineation may be useful, many effect plug-ins feature a number of identically named controls. (i.e. "Mix", "Low Cut", "High Cut" etc.) In this scenario, it could become difficult to identify which plug-in the "Mix" parameter you were writing/adjusting belonged to. A quick glance at the Slot value will ensure that the appropriate "Mix" parameter is being adjusted.



Click hold on the *1 Cutoff* panel on the *AudioInst 2* track in the Arrange window Track List. You will see a hierarchical menu like that shown in the image. To explain:

- *Main*—are the primary channel "controllers". They include Volume, Pan, Balance, Solo, Mute and Bypass functions.
- *es-pp*—menu entry contains the specific parameters for the es-p synth plug-in. All parameters that can automated in the plug-in are shown.
- *Tape Delay*—menu entry contains the specific parameters for this effect plug-in. All parameters that can automated in the plug-in are shown.

The entries shown in the menu (below the Main entry) reflect the plug-in "slot" order, as they appear in the associated channel fader. In this example, for *AudioInst 2*, the es-p would be "Slot 1", and the Tape Delay would be "Slot 2".

4.7 Editing

Please load the "Mix Demo Edit" song file for further exercises.

This section will introduce you to the techniques needed to make corrections and edits to existing automation data. You will also get a "feel" for handling the automation data, and should find it quite an "organic" and intuitive process.

On launch of the "Mix Demo Edit" song, you'll see an Arrange window with a zoomed *AudioInst 2* track, which contains an amount of Track Automation data. The automation data consists of several "nodes" connected by lines. Above or below each node, you will see a numerical value which indicates the "level" (as a percentage in this case) of the node.

Nodes and connecting lines can be interacted with directly through use of the mouse. You can select nodes, lines, or a combination of both while editing. You can also make use of "modifier" keys to change the behavior of the mouse when you click on lines or nodes.

4.7.1 Handling Nodes

Inserting Nodes

A short click anywhere in the automation track will insert a node at that position and value. A short click on, or just outside a line, will insert a node on the line. Please try this.

Deleting Nodes

To delete a node, simply click on it *quickly* i.e.—a short click. The position of the node will determine what happens to the automation data. Try these and use the Undo or Revert to Saved functions between each.

- Click on the first node, and it will be deleted. This will, in turn, make the second node the first node. A click on this node will delete it and make the (original) third node, the first node a.s.o.
- The same also applies to the last node, but works backwards from the last, second to last, third to last nodes a.s.o.
- Clicking on a node which falls between two other nodes will delete it, and the nodes which surrounded it will be joined directly by a recalculated line. To illustrate this, click on the forth node (bar 7—value of 57.480).

Moving Nodes

The behavior of nodes, when moved, is best illustrated by actually doing it. Please follow these steps.

- Click and hold on the third node (around bar 5—value of 37.795).
- Now, slowly drag it to the left.
- Continue dragging until it passes the position of the second node and watch what happens. Ensure that you keep the mouse button depressed.
- Now, move back to the right and watch what happens. When you've neared the node's original position, release the mouse button. You can freely move to the left or right, and the behavior will be the same.
- Click hold on the node again, and drag it vertically, again passing the vertical positions (values) of the nodes above it. Return it to its former position when done.

Moving Multiple Nodes

It is possible to select and move multiple nodes (and therefore the lines which connect them). You can move adjacent nodes—i. e. nodes that are beside each other—or you can move non contiguous nodes. Please follow these steps.

To select adjacent nodes:

- Click and hold on the line between nodes 2 and 3. Alternately, you can hold ⇧ and rubber-band select the desired automation area.
- In the dark gray area which appears, drag horizontally and vertically to see what happens.

For non-adjacent nodes, the technique is slightly different:

- Press and hold ⇧ and click on the nodes (or lines) you wish to select directly. Do this with node 2, node 7 (bar 13—value 57.480) and the last node.
- If you click the wrong nodes, simply click them a second time.
- You will notice that the nodes visually change from a solid to a hollow dot, indicating that multiple nodes are selected.
- Once again, release ⇧, click hold on any of the gray areas and drag horizontally or vertically.

To deselect all nodes, press ⇧ and click anywhere on the background of the automation track.

Limiting the Movement of Nodes

Logic "intelligently" analyses the direction of mouse movements, making the control over nodes in the Track Automation data much easier.

In cases where the mouse is initially moved in one direction—vertically or horizontally—the move is "limited" to this direction. This makes it easy to retain the nodes values while changing the positions, or to keep the positions while changing the values. If the mouse is moved on the other plane in the X-Y axis (horizontally or vertically), the directional "limit" will be overridden and you can freely position the nodes.

You can, of course, limit the movement of nodes to one direction.

- If you press ⇧ while changing the value, the selected nodes is limited to *horizontal* movement.
- If you press ctrl while changing the value, the selected nodes is limited to *vertical* movement.

4.7.2 Handling Lines

Lines are created automatically between nodes. The following "node" functions are pertinent to lines.

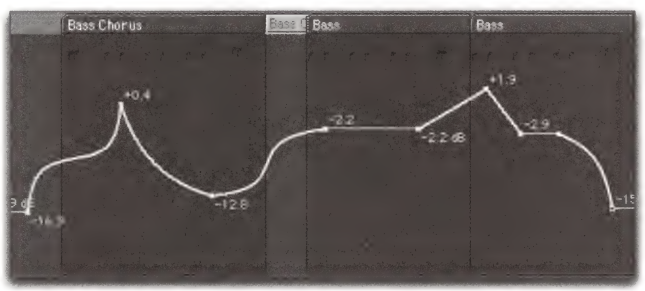
- a short click on, or just outside, a line (not a node) will add a new node on the line.
- a long click on a line allows you to move the line, along with its two end-points—i.e. the nodes that encompass the line.
- a long click outside a line will create and select a new node, allowing you to move that node immediately.

Curves

There may be occasions where you wish to create nonlinear automation data.

- Linear means a straight line.
- Nonlinear means curved.

Click-holding on a line or a selection, with ⌥ctrl depressed, allows you to set various curves on a line or the current selection.



Four types of curve shapes are available. These can be set by moving the mouse different directions:

- horizontal S-Curve
- vertical S-Curve
- convex
- concave

The most useful shape when changing the level is the *horizontal S-Curve*. Click on a line with ⌥ctrl depressed and move the mouse to the right.

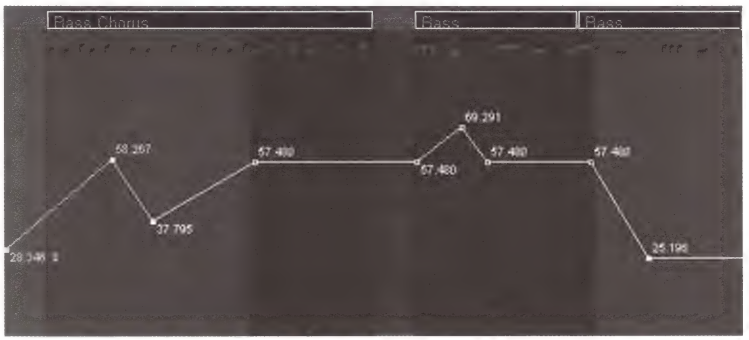
A short click while holding down ⌥ctrl on a line or a selection will reset the curve of the current line or current selection to linear—i. e. a straight line.

Please experiment with these.

4.7.3 Selection Handling

The following functions affect a selected area (selection) of visible automation data allowing you to cut, copy and move it.

Hold ⇧ and rubber-band select nodes 4 through to 8, as shown in the diagram, to try out these functions.



Delete

- Press the ⌫ key to delete the current selection.
- Select Edit > Undo Clear or use the ⌘Z Key Command, to reverse the deletion.

Copy

- Hold down ⌥ and click-hold on the selected area (this also works on lines and nodes). Drag the selected section to bar 21 on the right to copy it.
- Select Edit > Undo HyperDraw or use the ⌘Z Key Command, to undo the copy.

Move

- Deselect the area by clicking quickly on the background of the selected area.
- Now, hold down ⌥ and move your mouse cursor to a position just before node 5—bar 11.

- Click hold at this position and you'll notice that all data from the current mouse position through to the last node is selected. It can be freely moved horizontally or vertically.
- If you release the mouse button (but keep the keys depressed) and click at a position after node 5, the selection area will change.

Moved or copied automation data will automatically erase any data which exists in the destination area. This works "intelligently" with non-contiguous selections.

Important!

Why not apply the techniques you've learned about multiple selections and moving or copying automation data to see this "intelligence" in action?

4.8 The Final Mix

The Getting Started has introduced you to the basic information you will need to effectively record, arrange, edit and automate the mix of your audio and MIDI tracks.

The last step in the recording process is often referred to as the "(final) mix" or "mixdown" of your song. It contains:

- Audio Tracks
- Audio Instrument Tracks
- MIDI Tracks—recorded as audio files
- Any effects used on these tracks
- Automation of levels, pan positions, mutes and effect parameters etc. throughout the song

To facilitate your "mixdown", Logic features a *Bnce (Bounce)* button at the bottom of the Master Fader in the Track Mixer.

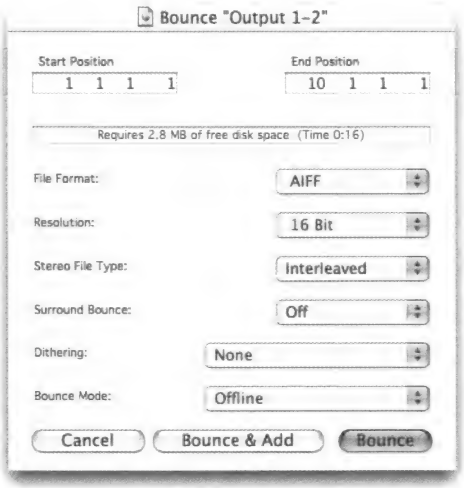
The "final mix" or *Bounce,* as it is known in Logic, is a real-time or "offline" (faster than realtime) digital process. The entire song—or a section of it defined by the left and right *locators*—is played. All mix automation data *of tracks routed to the selected Master Fader* is performed in realtime as the song is played back. These "mixed" and effected Audio tracks and Audio Instruments are combined into a single mono or stereo file. Mono/Stereo status is determined by the button beside the *Bnce* button.

It is also possible to *Bounce* to a number of discrete files for Surround sound purposes. Please consult the Logic Reference manual for further information.

4.8.1 Bouncing—Procedure

This section presumes that all Audio and Audio Instrument tracks have been recorded, arranged and have effects inserted or bussed appropriately. Any automation data for these tracks is also presumed to be "complete".

- Open the Track Mixer. Don't forget to make use of the various view buttons to the left of the window.
- Ensure that all Audio, Audio Instrument and/or Bus channels are routed to the desired Master fader.
- Ensure that the Automation *Mode* status is set to *Read, Touch* or *Latch* on each Audio, Audio Instrument and/or Bus channel that features automation track data.
- Click the *Bnce* button on the desired Master Fader (if you have audio hardware with more than one output pair). This will usually be "Output 1-2" or "Master 1". The following window will launch.



- Check that the *Start* and *End* positions are correct. By default, they will encompass the area from the beginning of the first audio region to the last audio region. You may wish to add an extra bar or so to the *End* position to ensure that you capture any Reverb "tails" or Delay repeats, if applicable.

- Select the other parameters—*Resolution, File Format, Filetype, Surround, Dithering* and *Bounce Mode* (*Realtime* or *Offline*) as desired, by click-holding in each flip menu panel. Further information on these parameters is available in the Logic Reference manual.
- Press the *Bnce* button and an operating system File Save dialog window will open. Browse to the desired folder, and name the file.
- Press *Save* and the bounce will commence.
- Once completed, the bounced file will be available for your use in CD-burning applications, Logic or other applications.

Please note that if *Offline Bounce Mode* is selected, you will not hear the audio being played during the process.

About MIDI Sequences and Tracks

MIDI sequences or tracks will not be *bounce*d unless they have been recorded as audio files, and assigned to Audio Tracks. There is a common misconception of users new to MIDI and digital audio recording that MIDI can be "converted" to audio. As outlined in the first chapter, MIDI and audio data are very different.

If your song contains MIDI sequences (played by your synthesizers, modules etc.) that you would like to include in your final mix, simply record them as you would any audio source. Once recorded as an audio file, you are free to insert effects, or perform any other process available for audio files and regions in Logic.

Tip

As a tip, we recommend that you record each MIDI part as a separate audio file. Use the track or sequence *Mute* or *Solo* functions, the locators and other techniques you've learned, to simplify the task. The advantage of keeping your MIDI tracks separate—and this can include individual drum sounds in a "kit"—is that you can individually process these sounds/parts. This gives you far more creative flexibility, and control, during the mixing process.

4.8.2 Bounce—Saving Resources

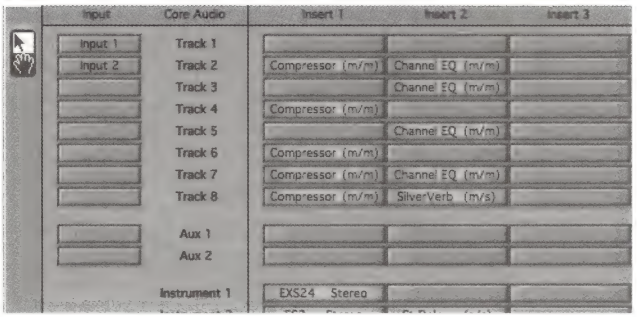
It should be noted that the *bounce* procedure is a very processor and disk-intensive task. It requires additional processing resources due to the fact that a new audio file is calculated and written, in addition to the playback of your various tracks and effects. The following collection of tips may assist you with your *bounces.*

- To check the status of your CPU resources before and during a *bounce*, please select the Audio > System Performance meter. This gives you an overview of the CPU and disk usage.

- Deselect any Audio Instrument tracks in the Track List—i. e. select a MIDI track.
- *Mute* any unused tracks in the Track List. Remember that *Mute* can be automated, so make use of this when parts are not playing.
- Disable the *Catch* function in all open windows, or better yet, close all windows except the Track Mixer.
- *Bypass* all unused effects. Remember that *Bypass* can be automated, so make use of this ability when the effect is not needed.
- For grouped fade ins or outs, use a *Bus* or *Master* fader, rather than automating each channel individually. It is more CPU-efficient and less labor intensive.
- Bouncing 24 Bit files is more disk-intensive. If bouncing for CD-delivery, use 16 Bit, 44.1kHz.
- If your system is close to its processing limits with the playback duties alone, you may need to use the *Offline Bounce Mode* option, as this is method does not need to calculate Audio Instrument parts and effects in realtime. The *Freeze* function will also be of benefit. Alternately, perform two discrete *bounce* processes, combining the resultant file of the first *bounce* with the remaining unbounced tracks. Use the *Solo* and *Mute* functions, or the *Outputs* or *Buses* to facilitate this.

4.9 Audio Configuration

While not strictly a "mixing" function, you may wish to experiment with or change your effects routings. You may also wish to quickly change the routing of your Audio and Audio Instrument tracks. While these tasks can be performed in the Track Mixer, Logic features an additional window which gives you an overview of your audio configuration. It is launched by selecting the Audio > Audio Configuration menu option.



A portion of the Audio Configuration window is shown above. It provides you with an overview of your Audio objects.

Once launched, the View menu provides you with options to view All or All Used Components.

The two Tools allow you to insert, remove, bypass and move effects. Please experiment with them.

The Edit menu provides you with options to Remove EQ's, Plug-Ins, Sends and the Record Path. The Edit menu also provides you with the usual cut, copy and paste functions. We'll allow you to experiment with these on your own, and ask that you take into account the following:

- Remove allows you to strip out all unused/unwanted effects by type.
- Cut, copy and paste functions work between songs.

When combined, you can quickly strip down one set of effects and/or routings from a song, and apply this routing configuration to another song.

5 Miscellaneous Info

First up, we'd like to congratulate you on working your way through the Getting Started. At this stage, you should be reasonably comfortable with the basic working methods, windows and terminology of Logic. You're probably also ready to get started on your own musical ideas and productions.

5.1 The Autoload Song

We ask that you re-load your Autoload song now. Feel free to make any desired changes to the Preferences, Screensets and Key Commands that you may have picked up, while working through the Getting Started. These don't have to be made right now, but keep them in mind. It's probable that you'll change your working methods as you become more familiar with the program. Remember that as you do, you should incorporate these changes into your Autoload song by changing the song Preferences and Screensets. Changes made to Key Commands and Global Preferences affect Logic at a program-wide level. Such changes are saved in the file ~/library/preferences/info.emagic.logic ("~" means the path to your user's folder, e.g.: harddisk/users/username/).

Also take a look at the *Environment Controls* section, from page 164 onwards, and the ensuing Environment information.

The Autoload song is the template for all of your future work. When starting a new project, the first thing you should do after Logic has launched, and (auto)loaded your Autoload song is to:

- Use the File > Save As... function, and give it a different name (and select the appropriate folder path, as desired).
- Following this, you're ready to go.

Please make use of the Getting Started and Reference manual if you need to jog your memory on working methods, or on customizing your Autoload.

The other topics in this chapter briefly cover the integration of Logic with external software and hardware, plus a few tips on customizing your Environment.

5.2 Logic Control

As the name suggests, Logic Control provides "control" over Logic's (version 5.5 and higher) many functions. The Logic Control XT is an expansion unit which adds additional channels.

The immediate benefit of using the Logic Control is that recording, mixing and editing tasks are greatly accelerated, as you have simultaneous "hands-on" control over multiple channels and/or parameters. These include; transport, scrubbing, mute, solo, volume, pan, plug-in parameters, screensets—in fact, any "control" you can think of. This control over multiple channels/parameters is more convenient than use of the mouse, which is limited to one task at a time.

Any changes made by you on the Logic Control's surface are reflected in Logic, in realtime. When these changes are recorded and played back, the Logic Control will physically update to "follow" the automation. Its motorized faders will move smoothly as fades are played back, the main display and the LED's for each switch will update in realtime to indicate their current value.

Important!

The Logic Control and *each* Logic Control XT unit (if applicable) must have a discrete MIDI IN and MIDI OUT connection to a free, dedicated MIDI port on your MIDI interface. We recommend the use of the Emagic Unitor8, AMT8 or MT4 interfaces.

When Logic Platinum 5 (or higher) is launched, it will automatically "sense" the Logic Control unit(s) and will send information about the current program and song settings. The current song position and parameter values will appear on the Logic Control's displays.

The faders, knobs and switches on the Logic Control and XT units do not have fixed functions or channels. This allows you to switch between fader "banks", or to increment in channels. To explain, audio channels 1—8 would be bank 1, audio channels 9—16 would be bank 2 a.s.o. Incrementing by channel could allow the switching between plug-ins where all 8 faders and knobs are assigned to the parameters of the plug-in. As an example, two instances of the ES2 synthesizer are inserted on Audio Instrument "channels" 3 and 4. Switching by channel allows you to toggle between the two. As you do so, the status of all relevant faders, knobs, switches and displays will update to reflect your current selection.

As new functions are added to future versions of Logic, the Logic Control unit(s) will automatically receive this information each time Logic is launched. This ensures that the Logic Control units will remain "current" for many years to come.

For further details on the Logic Control and its integration with Logic, please visit our website at *www.emagic.de*

5.3 Synchronization

Logic Platinum and Gold feature extensive synchronization facilities. These facilities allow you to "lock" Logic to film and video, drum machines, other sequencers, digital audio workstations (DAW's) and more. Logic can act as the *Master*—controlling the timing of the slave—or *Slave*—where Logic follows the timing of the master.

Logic Audio (formerly Silver) is limited to MIDI Time Code (MTC) and MIDI Clock synchronization. This means it can only be synchronized with devices which communicate their timing information via MIDI.

When synchronized, transport controls such as start, stop or continue are sent from the Master to the Slave. Timing information about the current bar/beat, or an "absolute time" position is also sent. Absolute time is measured on a 24 hour clock and is divided into hours, minutes, seconds, frames, sub-frames. The frames and sub-frames come from the use of synchronization with film. This terminology and technology was dreamed up by the Society of Motion Picture and Television Engineers (SMPTE).

- Absolute time is more commonly known as SMPTE time code. This type of synchronization is only available in Logic Gold or Platinum.
- MIDI Time Code (MTC) is the MIDI world's equivalent of SMPTE time code. It is available to all Logic versions.

- MIDI Clock is a simple timing pulse which is sent out. It does not contain any positional information, but does send start and stop messages.

The Transport Bar changed to display the current SMPTE (absolute time) position. This is achieved by clicking on the "down" arrow to the right of the display. From left to right it displays hours, minutes, seconds, frames, sub-frames.

The Logic Reference manual covers the specifics of each synchronization parameter, and their use, which we'll allow you to view at your leisure.

5.3.1 Synchronization Tips

If you are running an external MIDI device that is capable of sending MIDI Clock or MIDI Time Code (MTC) messages (Drum Machine, Sequencer, Workstation keyboard etc.) then you may encounter strange error messages or odd "stuttering" behavior in Logic. To rectify the problem, try these tips—one at a time:

- Open the Options > Settings > Synchronization Settings > General menu/page. Uncheck the *Transmit MIDI Clock and Transmit MTC* options which will stop a "loop" of MIDI synchronization data occurring.
- In the Options > Settings > Synchronization Settings > MIDI menu page, you can specify a port for synchronization data if you wish to send it to a specific device, but not to all of your devices.
- Check your digital clock settings (if applicable to your setup). Please consult the separate Installation Guide, and your audio interface documentation, for further information.

5.4 Environment Controls

After setting up all of your Instruments and Audio Objects, you may wish to add some additional objects for control over your MIDI devices.

Tip

Note that the addition of these objects is *optional*. They act as *remote controls* for your MIDI devices, and can be used to control virtually any function that your MIDI devices are capable of understanding. If you do not wish to incorporate this type of functionality into your Autoload, you can skip this section, and return to it at a later stage, should you change your mind.

The Windows > Open Track Mixer entry automatically creates a fader for each channel, including sub-channels, of each Instrument object in the Environment. Each MIDI fader in the Track Mixer also allows the use of up to four different types of controller, which you can freely reassign. If your MIDI mixing needs do not extend beyond manipulation of volume, pan, and filter cutoff and resonance, for example, then there is no need to create further Environment objects.

If you have a grander vision, this section of the Introduction Manual will provide you with examples for the set up of faders and knobs for control of volume and panning. For single Instruments, a single fader and pan pot will suffice. For Multi Instruments, faders will need to be created and assigned appropriately for each MIDI channel *used* by each Multi Instrument. We'll show you some great shortcuts which will speed up the process.

For control over other synthesizer functions, such as filter cutoff and resonance, or envelope controls, the procedures you will learn here can be applied. Note that this is entirely dependent on the capabilities of your synthesizer, and the controllers used will vary from machine to machine—if they can be used at all. As such, you will need to consult the documentation of your synthesizers for information on controller numbers.

If you own a GM, GS or XG synthesizer, you create a GM Mixer object which offers control over volume, pan and several other continuous controllers, plus effects functions. See the *Environment Processing* section, from page 171 onwards.

5.4.1 Setting Up a Single Fader

To set up a fader, simply select New > Fader. There are, as you will see, a number of choices available in the Fader sub-menu. For now, choose Auto. This will generate an onscreen fader. Faders can be assigned to any MIDI channel, and require no special cabling to be functional. Fader objects can *generate* MIDI data of different types that can be:

- Sent out of Logic.
- Recorded.

Fader objects can also respond to incoming MIDI messages and can convert these messages to different types of MIDI data.

The fader in the image has been named "Vol 1". Also take note of the parameters box to the left. In particular, pay attention to the *Out* and *In* assignments, plus the *Channel* and *-1-* entries. As you can see, these are matched.

Click on the *Out*, *In* and *-1-* entries to check out the options available in these menus. The value of *7* assigned to the *-1-* entries corresponds to the MIDI Controller number for "Volume". MIDI Controllers are often called *continuous controllers,* and are regularly displayed as follows in MIDI device manuals: "CC#*7*" or "CC*7*"—Volume.

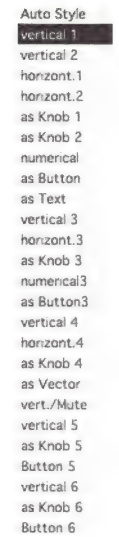
Controller Input

If you were to change the value of the *-1-* entry, under the *In* section to say, CC#19 (a value of *19 = General # 4*, in the flip menu), the fader would only respond to controller 19 messages coming *in* to it on MIDI channel 1. All other messages would be ignored. This ability (of the fader object) to ignore, rechannelize and convert MIDI data on the fly is particularly useful for external hardware controllers.

As an example, your MIDI keyboard may have a single slider or a modulation wheel as its only hardware control option. Using the remapping facilities of the Fader object, you can use a single hardware controller for manual manipulation of volume or other types of MIDI continuous controller. Obviously, having multiple faders on an external controller makes life easier, but in many cases, even multi-fader external controllers will only transmit on a single MIDI channel or will use the same CC number on different MIDI channels. Using the fader object's *Controller Input* facilities allows you to specify the incoming MIDI channel, CC number data that the fader will respond to.

Please refer to your synthesizer or MIDI device manuals for specifics on controller numbers and their operation.

Controller Output



The *-1-* entry under the *Out* section, allows you to assign the type of continuous controller *sent* by the fader object. As shown in the example above, *CC#7*—Volume, is being sent by the fader. To change this fader's functionality to act as a Pan control for MIDI channel 1:

- Click-hold on the number *7* alongside the *-1-* entry, under the *Out* section.
- Select *CC#10—Pan* from the flip menu.

Most people normally associate pan controls with a knob. To change the appearance of the Fader to a Rotary knob.

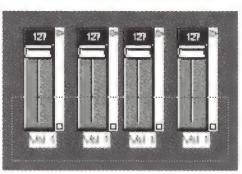
- Click on the *Auto Style* text in the fader's parameters box.
- Select any of the *as Knob* styles available. Selection of Knob style 2 is shown alongside.
- You can also change the appearance of an "Auto Style" fader by click-holding on the small box to the fader's lower right and dragging the fader's outline to a different size or shape—i. e. square as opposed to rectangular. When you release the mouse button, the fader's appearance will change.

You can directly interact with the fader object—and therefore generate data—by click-holding on it, and moving the mouse. The movement of the mouse will vary, dependent on the style of the fader, e. g. horizontal movement will not affect a vertical fader.

Setup Shortcuts for Multiple Faders

Let's look at some shortcuts for building an automated mixer.

- Select a layer on which you have created a Multi Instrument
- Create a new fader, if one doesn't exist.
- Hold the ⌥ key down, and while doing this, click and drag the fader object to the right. Release the mouse button and ⌥ key. This should have created a copy of the fader object.
- Rubber-band select the two fader objects by clicking outside either fader, and dragging, while the mouse button is held down. Drag the outline box until both faders are highlighted. Below, four fader objects are selected.



- Once highlighted, release the mouse button.
- Hold the ⌥ key down, and while doing this, click on either fader object and drag to the right. Release the mouse button and ⌥ key.
- You should now have 4 faders onscreen. Repeat until enough faders have been created for all *used* MIDI channels of your connected MIDI instrument.
- Rubber-band select *all* faders, double-click on the *Multiple sel* text in the parameters box, and type in *Vol 1*, as shown.

- Note that all of your faders have been automatically, and sequentially, renamed *Vol 1* to *Vol 16*.
- Last step is to change the *Control Out and Control In* MIDI channel for *each* fader. By default, all faders will be assigned to MIDI channel 1 for both *Control In* and *Out*. You will need to change the "Vol 2" fader object to MIDI channel 2, the "Vol 3" fader object to MIDI channel 3, the "Vol 4" fader object to MIDI channel 4 a.s.o.
- This is done most efficiently by selecting the Options > Apply Buffer Template to > Definition, Channel Increment function.

This same set of procedures can be applied to fader objects assigned to *any* other controller. As an example, if you wanted to set up pan pots for your mixer, you could simply rubber-band select your existing faders, and copy them using the technique above.

While all copied faders are selected;

- Rename them to "Pan 1".
- Change the *Output* controller number from *CC#7* (Volume) to *CC#10* (Pan).
- Change the faders to knobs.

Tip

You can also copy existing faders between Environment *layers* by selecting the standard Edit > Copy and Edit > Paste functions.

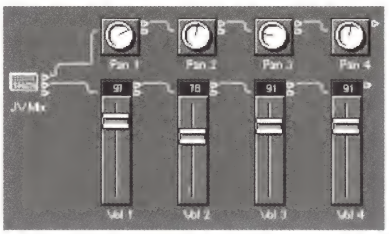
5.4.2 How to Automate Faders

While not necessary for the recording and playback of volume, pan and other types of MIDI controller data, it can be helpful to see your faders moving during playback. The advantage is that when you move to different sections of your arrangements and songs—when in *pause* or *play* mode—your faders will update to reflect the current volume, pan (or other continuous controller) setting for each channel on each MIDI device. This at-a-glance overview can be very helpful when trying to isolate a part that isn't "sitting" properly in your mix.

Note that the Windows > Track Mixer is fully automated, and that Logic's Track Automation system provides graphical automation tracks in the Arrange window. The automation tracks allow a far more accurate overview of various parameter settings/levels than is possible with any onscreen fader.

The "Mix" Object

The best solution for this type of "flying fader" automation (outside of using the Track Mixer) is to set up a *mix* object for all channels to be recorded to. See the diagram below.



In this example, the output of the "JV Mix" object has been routed in to the Pan and Vol objects. If you wish to set up a similar set of faders and a Mix object in your own Environment, follow the steps outlined in the preceding sections and this section, substituting JV Mix for your own object name.

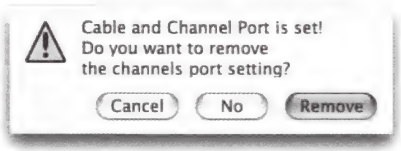
The JV Mix object is simply an *Instrument* object, created via the New > Instrument menu. Its icon has been changed to that of a Mixer and the *Cha* parameter has been set to *All*.

- Create your own "Mix" object using this method.
- To set the *Cha* parameter to *All*, click-hold on the Instrument (Mix object) parameter box *Cha* value of *1*, and drag the mouse *down*.
- As a nice shortcut for changing the icon, you can double-click on the existing Instrument icon, in the parameters box, and type in *304*. This will change it to the mixer icon shown.

Tip

- Use any of the naming techniques you learned earlier to rename the object. It is recommended that you give it a name which is relevant to the device it is controlling.
- Note that all of the Pan and Vol fader objects have been cabled *serially*—i.e. one after the other. To cable your faders in this fashion, rubber-band select them and select the Options > Cable Serially menu item.

- When cabling the Instrument—i. e. JV Mix—object into the first of your faders, as per the image, you will see the following dialog box. Select *Remove*.



- After doing so, note that the port previously shown in the parameters box will now display *No Driver* or will appear as a blank space above the *Cha* line.
- Repeat this procedure for each channel, of each device (where applicable), on each layer.
- Once done, save your "Autoload" song via File > Save.

Important!

Using the Mix Object

Please give the following a try, to ensure that your cabling is correct, and to get a feel for using the Mix object/Track.

- Select the JV Mix object in the Arrange window's Track List by click-holding on any Track name and scrolling through the hierarchical flip menu. Once the JV Mix object is found, release the mouse button.
- Reposition your windows to allow the viewing of the Environment layer on which the JV Mix object and your faders exist, plus the JV Mix track in the Arrange window.
- Activate *Record* via the Transport Bar or Key Command.
- Move your faders and knobs. As you do so, you'll note that data is recorded onto the JV Mix track.
- Once done, stop recording by pressing the *Stop* button on the Transport Bar, or via the Key Command.
- On playback, the output of the JV Mix track/object is routed *in* to the various faders and pan pots causing them to move in response to the incoming data.

Recording Preferences

Logic's Recording preferences have a part to play in the way your sequence data—controllers or MIDI notes—appears. These preferences will affect the way that any MIDI Mix automation appears in the Arrange window.

Note that this does *not* affect the Track Automation system.

Open the File > Song Settings > Recording Options... menu entry. You will see several options here, which allow you to "merge" or "auto create" tracks. We will discuss these recording options in more detail later, but for now, keep the following in mind:

The *merge* options will combine all incoming MIDI data into a single sequence on the JV Mix track. Recording all of your MIDI mix information to one track keeps things neat onscreen, and all mix automation data in the one place. Editing is easier because you don't need to open several Event List or HyperEdit windows to deal with multiple tracks. Additionally, if you want to isolate data, you can simply use the *Select Equal* or *Similar* filters in your editing windows, which we'll discuss in the next chapter.

If the *auto create* options are selected, your automation data will be recorded onto several discrete sequence objects, as you record individual fader movements on each "pass" or "take". The advantage of this is that your fader automation tracks will be recorded on a per-fader basis, with a discrete sequence appearing in the Arrange window for each fader's data. While this offers some advantages, you can quickly end up with a number of sequences stacked on one track—i.e. the JV Mix track, or you can end up with a number of tracks. Either way, your Arrangement can quickly become filled with automation sequences and these sequences will be difficult to manage and edit.

Try both the merge and auto create options as you become more familiar with working in Logic, and set the appropriate preferences.

We strongly recommend the use of the Track Automation system, which we'll discuss a little later in the Introduction Manual.

5.5 Environment Processing

You can cable various objects together to create different types of "machines" or processors for your MIDI data.

This brief section will touch on a couple of the other data processing objects you will find in the Environment, and will offer some practical examples of where they may be useful to you—both musically, and on a technical level. There are many more types of objects that are available in the Environment, including; arpeggiators, chord memorizers, delay lines etc.

The point behind this section of the chapter is to introduce you to some creative ways of looking at the use of the Environment objects and a couple of key concepts. Namely:

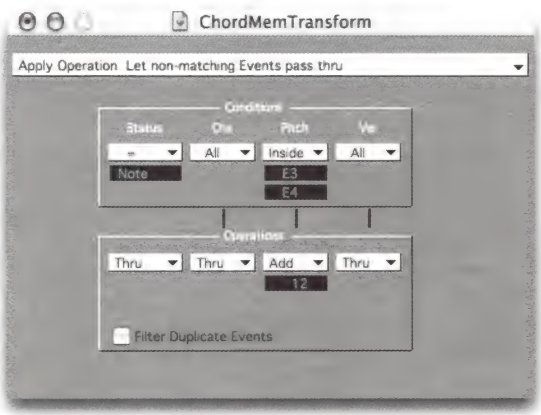
Important!

- Objects can often be used for tasks that extend beyond their obvious use.
- Objects, when combined, can perform tasks that utilize a little of each object's functionality to create a new processor. This new multi-object processor may perform a function that is unrelated to the functionality—obvious or otherwise—of the individual objects. In other words, the sum of the parts is far more than the individual components used.

We encourage you to spend some time—over the coming months—experimenting with each object in the Environment, to familiarize yourself with their practical and possible uses.

The Transformer Object

Please double click on the Transformer object. It will open a window which looks like the following.



Without going into extensive detail here, the Transformer object is used to "transform" one kind of data into another. In the Environment window, the Transform object does this in realtime. To explain the settings used in this example:

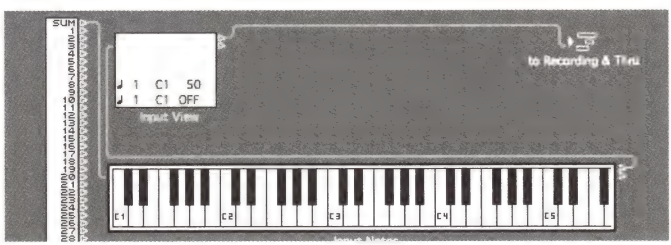
- The top flip menu is set to *Apply Operation & Filter non-matching Events*. This means that it will perform any transform operations specified in the *Operations* box and will ignore any event which does not match the criteria set in the various *Conditions*.
- The *Status* is *equal to* (=) *Note* events. All other events—i.e. any MIDI event that is *not* a note event, will be ignored.

- The *Cha* is set to *All*, which means that MIDI note events on any MIDI channel will be allowed Thru, without being processed by any operation.
- The *Pitch* values, as shown, are limited to MIDI note events which fall between (*Inside*) *E3* and *E4*. All note events which are outside this range will be ignored.
- Directly below the *Pitch* condition, an *Add* operation has been applied, with a value of *12*.
- Although it looks a little technical, this is quite easy to understand. All MIDI note events which fall between E3 and E4 will have their pitch values added to by 12. In other words, notes within this range will be transposed up by one octave.
- As the sequence is playing, adjust the range of notes by click-holding and dragging on the upper and lower values—*E3* and *E4*. Adjust the *Pitch* operation value of *12* using the same method.
- Click hold on each of the flip menus and try different options out, to familiarize yourself with the Transformer object.

Tip

The Transformer is the most flexible object in Logic's Environment. It can be used for a wide variety of tasks, including use as a simple junction box or a MIDI data filter. Please read the Reference manual for a detailed look at the Transformer.

The MIDI Monitor Object



This shows several objects set up before the Sequencer Input object, which is named "to Recording and Thru" in the diagram.

The Cable Switcher and Transformer objects can re-route and process data before entering the sequencer, much like the Arpeggiator example discussed at the beginning of the chapter. Please double click on the Transformer objects to see how they are set up. The Pre and Post Process View boxes that you can see are MIDI Monitor objects. The one on the left shows the raw MIDI data, and the MIDI Monitor on the right shows the data after it has been processed by either of the Transformer objects. The keyboard object simply displays incoming note data.

A simple connection from the Physical Input object to the Sequencer Input object will suffice for getting MIDI data into Logic. The more complex routing shown is not necessary, but use of a MIDI Monitor object can prove useful on input, for trouble-shooting purposes.

This concludes this brief look at some of the Environment's many objects. Once again, we encourage you to do a little experimentation on your own, and to read the Reference manual for detailed information on each of the Environment objects.

5.6 MIDI Meets Audio

Logic's Environment is, as you've discovered, responsible for getting MIDI and audio data in and out of the program.

We very briefly discussed the Audio Instrument objects in the *Audio Instrument Object* section, from page 68 onwards. As mentioned, the Audio Instrument object is unique among the Audio objects in that it can accept MIDI *note* input.

In practice, playing or recording an Audio Instrument is just like playing or recording a connected MIDI synthesizer or sampler. The Environment's MIDI processing options—arpeggiators, transformers etc.—available to connected MIDI devices, are also available to these Software Instruments.

All you need do is remember the lessons learned in this chapter regarding signal flow. Cable the MIDI processors *in* to the appropriate Audio Instrument object, set up the desired parameters, and get creative.

Please refer to the Environment chapter of the Reference Manual over the coming weeks. It contains detailed information about the parameters of each Environment object. This information will assist you in further enhancing your knowledge and working experience with Logic.

Bye, for now...

That concludes the Logic Getting Started.

Please make use of the Reference manual and our online resources at *www.emagic.de* Our international distribution team and dealer network are also available to assist you with any sales or technical queries you may have.

We wish you many years of successful music making, inspiration and enjoyment with Logic.

We will continue to bring you the very best in music technology and look forward to a long and fruitful creative partnership with you.

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